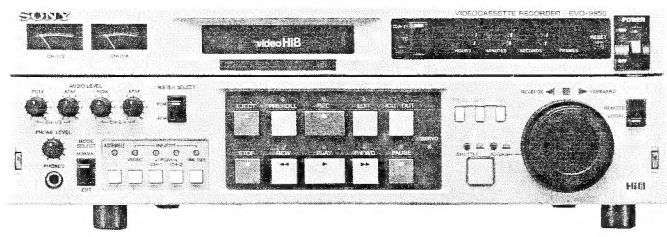
SONY

Hi-8 VIDEOCASSETTE RECORDER

EVO-9850

SERVICE MANUAL

Vol. 1 (Revised 1)



Hi8

SPECIFICATIONS

System

Recording system	Rotary 2-head helical scan Luminance: FM recording Color signal: Converted subcarrier direct recording
Video signal system	EIA standards, NTSC color
Audio recording system	AFM: Rotary head, FM system (matrix stereo) PCM: PCM format (two channels)

Video

Inputs	VIDEO IN (BNC type) x 1 1.0 Vp-p ± 0.3 Vp-p, 75 ohms unbalanced, sync negative S-VIDEO IN (4-pin mini-DIN) x1 Y: 1.0 Vp-p ± 0.3 Vp-p, 75 ohms, unbalanced, sync negative C: 0.286 Vp-p ± 0.07 Vp-p at burst level, 75 ohms, unbalanced DUB IN (7-pin) x 1 for 8 mm video Y: 0.5 Vp-p ± 0.2 Vp-p, 75 Ω, sync negative C: 0.5 Vp-p ± 0.1 Vp-p, 75 Ω, AC coupled (75% color bar red)
Outputs	VIDEO OUT (BNC type) x 1 1.0 Vp-p ± 0.2 Vp-p, 75 ohms, unbalanced, sync negative DUB OUT (7-pin) x 1, 8-mm/U-matic selectable MONITOR TV (8-pin) x 1 MONITOR VIDEO (BNC type) x 1 S-VIDEO OUT (4-pin mini-DIN) x 1 Y: 1.0 Vp-p ± 0.2 Vp-p, 75 ohms, unbalanced, sync negative C: 0.286 Vp-p ± 0.05 Vp-p at burst level, 75 ohms, unbalanced
Horizontal resolution	Hi8 mode recording: 400 lines (both B/W and color) (S-VIDEO signals) Standard 8-mm format recording: 240 lines (both B/W and color)
S/N	Hi8 mode: More than 45 dB (color) Standard 8-mm format: More than 45 dB (color)
Sync signal input	REF VIDEO IN (BNC type) x 2, loop-through 1.0 Vp-p ± 0.5 Vp-p, 75 ohms, unbalanced, sync negative
Recording level control	Automatic

Audio

Input	AUDIO INPUT CH-1/L, CH-2/R (XLR 3-pin female) x 1 each (mic/line selectable) LINE: 600 ohms, +4 dBm, balanced MIC: 10 kilohm, –60 dBs, balanced AUDIO INPUT CH-3/L, CH-4/R (XLR 3-pin female) x 1 each 600 ohms, +4 dBm, balanced
Output	AUDIO OUTPUT PCM CH-1/L, CH-2/R and AFM CH-3/L, CH-4/R (XLR 3-pin male) x 1 each +4 dBm (at 600 ohm load), balanced MONITOR AUDIO (phono jack) x 1 –5 dB (at 47 kilohm load) MONITOR TV (8-pin) x 1 PHONES (stereo phone jack) For 8-ohm headphones Level adjustable (from –18 to –46 dB)
Frequency response	AFM: 30 to 15,000 Hz PCM: 20 to 15,000 Hz (for audio channels 1, 2, 3 and 4)
Dynamic range	PCM: More than 80 dB
Wow and flutter	Less than 0.005 % RMS
Recording level control	Manual

Other functions

Sync system	Automatic switching between internal and external
Dropout compensator	Built-in
Remote control	REMOTE 1 (9-pin) x 1 Conforming to RS-422A TBC REMOTE (D-SUB 15-pin) x 1

Tape transport

Tape speed	14.3 mm/sec.
Recording and playback time	About 120 minutes (with E6-120/P6-120)
Fast forward and rewind time	Within 3 minutes (with E6-120/P6-120)
Pause	A still picture is obtained with long pause function
Search	Still, 1/20 to 17 times normal speed in forward and reverse directions
Usable tape	8-mm video system cassette tape For business use: E6-HMEX, P6-HMPX The above cassette are designed for businessed use and offer the best drop-out level E6-HME, P6-HMP, P6-MP series and equivalent We highly recommend you use P6-HMPX series tape for editing application becaue of durability. Don't use home-use 150 minutes cassettes tapes.

General

Power requirements	100 to 120 V AC, 50/60 Hz
Power consumption	60 W
Operating position	Horizontal (up to 20 degrees)
Storage temperature	–20°C to +60°C (–4°F to 140°F)
Operating temperature	5°C to 40°C (41°F to 104°F)
Dimensions	424 x 146.5 x 452 mm (w/h/d) (16 3/4 x 5 7/8 x 17 7/8 inches) not including projecting parts and controls
Weight	About 14 kg (30 lb 14 oz)
Supplied accessories	AC power cord Cleaning cassette Operating instructions

Recommended video equipment and accessories

SMPTE time code interface kit EVBK-100
TBC remote control unit BVR-55
33P editing interface BKU-703A
Rack mount kit RMM-980
Editing control unit RM-450, BVE-600, BVE-910,
RM-440 (when the BKU-703A installed)
Digital multi effects system DME-450
Audio mixer MXP-29/VSP-A600
Multi remote control unit RM-555 (when BKU-703A installed)
Remote control unit RM-500, RM-580 (when the BKU-703A installed)
Video and audio switcher BVS-500
VTR selector RM-V5
Color video monitor Sony CVM and PVM series
Color video camera Sony DXC series
Remote control cable RCC-5G (9-pin), RCC-5F (33-pin)
Dubbing cable VDC-5 (5 m)
Monitor connecting cable VMC-3P (3 m), VMC-5P (5 m), VMC-10P (10 m)
S-VIDEO connecting cable YC-30V (3 m), SYC-2 (2m), SYC-5 (5 m)
Cleaning cassette V8-25CLH

Design and specifications are subject to change without notice.

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SECTION 1
GENERAL DESCRIPTION

1-1. FEATURS

Advanced editing functions

Electronic editing functions

Using two EVO-9850s and the RM-450 editing control unit, a high-quality automatic electronic editing system can be constructed.
The preroll button allows you to perform manual editing in insert mode or assemble mode. In addition, using the BVE-600 series or BVE-900 series editing control unit (accessories) allows you to perform A/B roll editing[1] under the control of the 8-mm time code and built-in time base corrector (TBC)[2].

Quick access to edit points

The search dial gives you quick access to edit points. In SHUTTLE mode, you can play back pictures at any speed from 1/20 times to 17 times normal speed, in both forward and reverse directions. Still playback is also supported. In JOG mode, you can play back pictures at speeds from 0 to 1 times normal seed. Sound monitoring in JOG and SHUTTLE mode enables you to search for edit point easily.

Built-in 8-mm time code generator/reader

The built-in time code generator allows you to record 8-mm time codes together with video or audio signals. 8-mm time codes are read by the built-in time code reader during playback.

LED time counter

The unit's LED time counter displays the tape running time and 8-mm time code in hours, minutes, seconds and frames. This display is useful for checking recording times and the current tape position.

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1) **A/B roll editing:**
Editing system using two or more player VTRs and a recorder VTR.

2) **Time Base Corrector (TBC):**
An electronic circuit that stabilizes the playback signal electronically. The time base corrector reduces the deterioration in picture quality when transmitting or copying playback signals.

Ease of operation

Four channel audio

The unit has four input XLR connectors. You can select the channels for PCM[1] digital stereo recording or AFM[2] analog stereo recording by changing the switch position. The unit has two output XLR connectors for PCM audio and two output XLR connectors for AFM audio.

Noise reduction system

The digital luminance/chrominance noise reducer provides superior picture quality and makes life-like color reproduction possible.

Built-in time base corrector

The unit features a built-in time base corrector to compensate for timing irregularities. Thus, the unit outputs a stable playback video signal synchronized with the external reference signals. It can then supply those stable video signals to any kind of video equipment. The unit has switches and controls on its sub panel with which those video signals can be adjusted. Adjustment can also be done remotely by using the BVR-55 remote control unit (not supplied).

Easy-to-use front panel

All important controls have been clustered on the easy-to-use front panel. This panel is divided into an upper and lower part. The control panel can be tilted for the operator's convenience.

Setup menus

Settings can easily be made by using the front panel controls and menus displayed on the screen.

Standard 19-inch rack size

The unit can be mounted in an EIA standard 19-inch rack.

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1) **PCM (Pulse Code Modulation) recording:** The audio signal is converted to a digital signal and then recorded to the tape. PCM recording enables high quality sound with less distortion to be recorded and played back. This audio signal is recorded onto the tape's PCM tracks, so that you can later record an audio signal onto the PCM tracks of the tape where an AFM audio signal and video signal have already been recorded.

2) **AFM (Audio Frequency Modulation) recording:** The audio signal is frequency-modulated and then recorded with an FM video signal.

Others

Remote control operation

The unit can be controlled from Sony editing control units such as the RM-450, BVE-600 and BVE-910 via a standard RS-422A serial interface.

Self-diagnostics

In the event of a malfunction, the unit performs a self-diagnostic test and displays any error code in the time counter display window on the front panel and on a video monitor connected to the MONITOR connector.

Dubbing connector

The unit is equipped with 8-mm video input and output dubbing connectors. You can use these connectors to perform editing and dubbing to another EVO-9850 with very little degradation in picture quality. Also, by using the U-matic output dubbing connector or S-VIDEO input and output connectors, you can perform editing and dubbing to other Betacam SP VTRs, S-VHS VTRs and U-matic VTRs.

External time code interface

The EVBK-100 SMPTE time code interface kit (not supplied) allows the system to convert the 8-mm time code currently being played back to the SMPTE[1] time code (LTC)[2]. Also, this interface can lock the built-in time code generator to the incoming SMPTE time code.

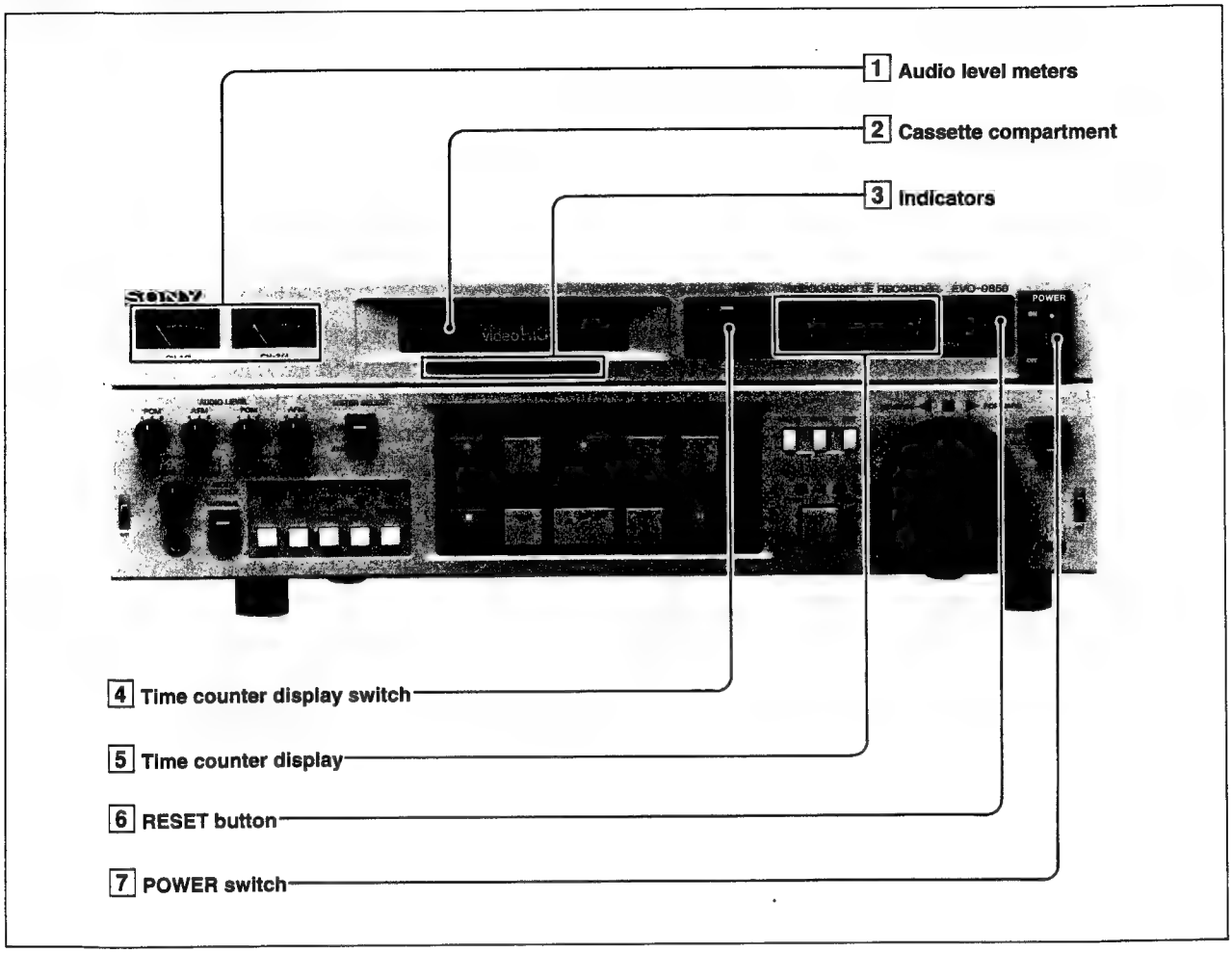
1) **SMPTE:**
Abreviation of Society of Motion Picture and Television Engineers, established in the USA.

2) **LTC (Longitudinal Time Code):**
A time code recorded on a separate track at the edge of the tape.

1-2. PARTS INDENTIFICATION

1-2-1. Control Panel (Front)

(Upper Control Panel)



Upper control panel

1 Audio level meters
Indicate the audio recording level in recording or EE[1] mode, and playback level in playback mode.

2 Cassette compartment
Insert cassettes here.

1) **EE mode (Electric-to-Electric mode):**
The input video signal, that has passed through the amplifier in the recorder, is displayed on the monitor. This is an EE mode picture, which enables the input signal to be checked on the monitor. The unit automatically enters EE mode when it is set to stop, F FWD or REW mode.

3 Indicators

indicator

Lights when a cassette is in the cassette compartment.

AUTO OFF indicator

Lights at power-on when moisture has condensed inside the unit. While this indicator is lit, a cassette cannot be loaded.

STAND BY indicator

Lights while a tape is being threaded from or unthreaded to the cassette inside the unit.

TC (time code) indicator

Lights when an 8-mm time code is being recorded, or when a tape on which an 8-mm time code has been recorded is being played back.

PCM indicator

Lights when sound is being recorded onto the PCM tracks of a tape or during PCM audio playback.

SP (standard play) indicator

Lights when the power is turned on. This lamp goes off when a tape recorded in LP (long play) mode is played back.

Hi8 indicator

Lights when the power is turned on. This lamp goes off when a cassette that is not recorded in Hi8 format is loaded.

4 Time counter display switch

Selects what is displayed in the time counter display 5, as follows.

COUNTER: Displays the amount of tape travel in hours, minutes, seconds and frames.

TC: The item to be displayed depends on the setting of the U BIT/TIME switch on the sub panel.
When the U BIT/TIME switch is set to TIME: Displays the 8-mm time code.
When the U BIT/TIME switch is set to U BIT: Displays the user bit.

DIAL MENU: The unit enters the dial menu operation mode. The dial menu is displayed. In this mode, any other functions are deactivated.

5 Time counter display

Displays the item selected by the time counter display switch 4.

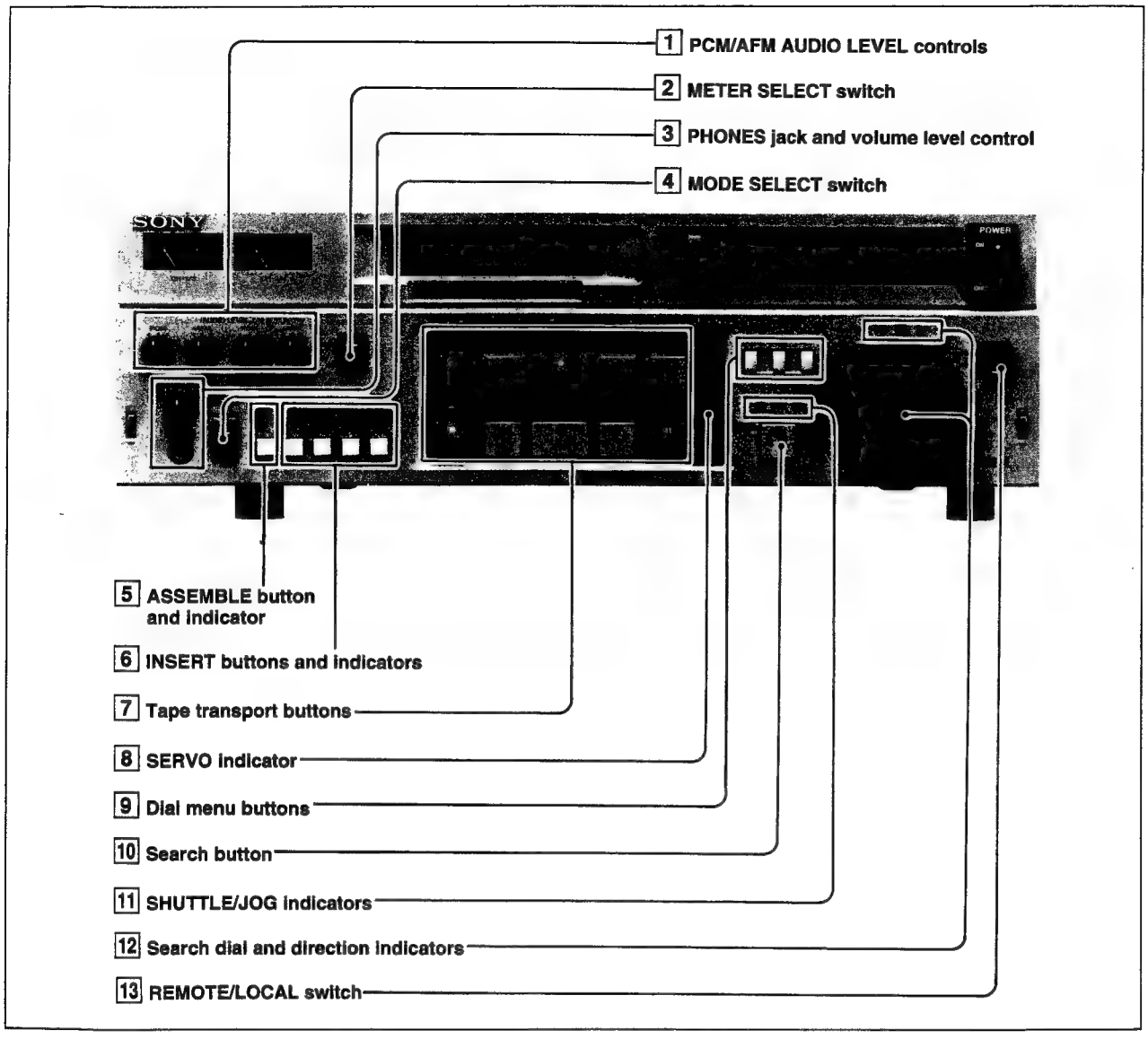
6 RESET button

When the time counter display switch 4 is set to COUNTER and the time counter display 5 indicates the amount of the tape travel, press this button to reset time counter display and display 0:00:00:00 on the time counter display.

7 POWER switch

Set this switch to ON to turn on the power. The audio level meter and time counter display will light.

(Lower Control Panel)



Lower control panel

1 PCM/AFM AUDIO LEVEL controls

You can adjust the audio recording levels independently as shown below.

Functions of PCM/AFM AUDIO LEVEL controls

Control	Input signal to be adjusted	
	Input connector	Recording system
PCM CH-1	CH-1/L or CH-3/R	PCM
PCM CH-2	CH-2/R or CH-4/R	PCM
AFM CH-1	CH-1/L or CH-3/L	AFM
AFM CH-2	CH-2/R or CH-4/R	AFM

2 METER SELECT switch

Selects the audio whose level is to be displayed on the audio level meter.

PCM: Displays the recording level while the audio input signal is being recorded onto the PCM track. During playback, the meter displays the playback level.

AFM: Displays the recording level while the audio input signal is being recorded onto the AFM track. During playback, the meter displays the playback level.

3 PHONES jack and volume level control

Connect 8-ohm stereo headphones to monitor the signal selected with the MONITOR SELECT switch. Adjust the volume with the volume level control.

4 MODE SELECT switch

EDIT: Set the switch to this position to perform editing. The unit is always synchronized with the input video signal regardless of the operation mode (record, playback, etc.)

NORMAL: Set the switch to this position in playback mode. The unit is synchronized with the internally-generated reference signal.

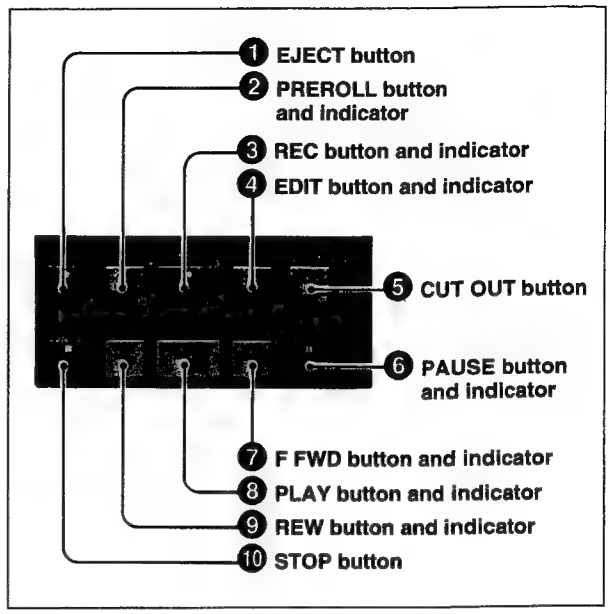
5 ASSEMBLE button and indicator

Press this button to select ASSEMBLE edit mode. The indicator above the button will light. Press again to cancel ASSEMBLE edit mode.

6 INSERT buttons and indicators

In INSERT edit mode, press the VIDEO, PCM CH-1, PCM CH-2 or TIME CODE buttons to select the desired input signal. The indicator above the selected button lights. To cancel, press the button again. The light will go off.

7 Tape transport buttons



Tape transport buttons

❶ EJECT button

Press this button to eject the cassette.

❷ PREROLL button and indicator

When you press this button, the tape is rewound for 5 seconds then stops in pause mode.

❸ REC (record) button and indicator

Press this button together with the PLAY button to start recording.
Pressing the REC button allows you to monitor the picture and sound in EE mode, as long as you keep the button held down.

❹ EDIT button and indicator

Press this button together with the PLAY button to start editing.
Pressing the EDIT button allows you to monitor the picture and sound of the input signals selected with the ASSEMBLE or INSERT buttons in EE mode, as long as you keep the button held down.

❺ CUT OUT button
Press this button to finish ASSEMBLE or INSERT editing. Edit mode is canceled, but the tape continues to run in playback mode. When you press this button in record mode, record mode is canceled. When you press this button in pause mode after preroll, edit mode is canceled.

❻ PAUSE button and indicator
Press this button to stop the tape momentarily. To restart the tape, press this button again. When you press this button during recording, the EE picture is displayed. When you press this button during playback, a still picture is displayed. When you press the PLAY, F FWD, REW or search buttons during pause mode, pause mode will be released and the tape will run in the mode corresponding to the pressed button.

❼ F FWD (fast forward) button and indicator
Press this button to fast forward the tape. You can monitor the picture and the sound in EE mode during fast forwarding.

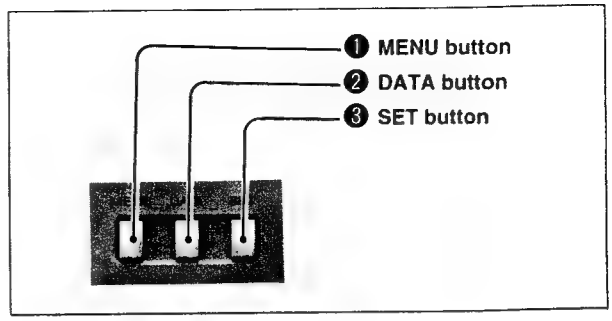
❽ PLAY button and indicator
Press this button to start playback.
Press the PLAY button together with the REC or EDIT button to begin recording or editing.

❾ REW (rewind) button and indicator
Press this button to rewind the tape. You can monitor the picture and the sound in EE mode during rewinding.

❿ STOP button
Press this button to stop the tape transport completely. You can monitor the picture and the sound in EE mode during stop mode.

[8] SERVO indicator
During playback, lights when the drum servo and capstan servo lock.

[9] Dial menu buttons
Use the following dial menu buttons only when you set the time counter display switch to DIAL MENU to change the settings on the menu.



Dial menu buttons

❶ MENU button
While holding down this button, turn the search dial in JOG mode to select the menu item.

❷ DATA button
While holding down this button, turn the search dial in JOG mode to set the data.

❸ SET button
Press this button after changing one or more items in menu. The changes will be saved.

[10] Search button
Press this button to place the unit in search mode. Searching with the search dial in JOG or SHUTTLE mode is now possible.
You can enter search mode without pressing the search button. Refer to dial menu 209 of the enhanced menu on chapter 2 for more information.

[11] SHUTTLE/JOG indicators
The SHUTTLE indicator lights when the unit is in SHUTTLE mode. The JOG indicator lights when the unit is in JOG mode. To change the mode, press the search dial.

12 Search dial and direction indicators

Functions as a search dial to quickly locate edit points. Or, functions as a selector for the dial menu operation, according to the setting of the time counter display switch.

Function of the search dial

Time counter display switch setting	Function of the search dial
COUNTER or TC	Search for edit point
DIAL MENU	Dial menu operation

The details of the functions are as follows.

Search for edit point

Set the counter display switch to COUNTER or TC, then press the search button. You can search for an edit point by rotating the search dial to change the playback speed and direction in JOG or SHUTTLE mode. Press the dial to toggle between SHUTTLE or JOG modes. The SHUTTLE or JOG indicator will light to indicate which mode you have selected.

Search dial function in SHUTTLE/JUG mode

Mode	Dial function
SHUTTLE mode	Turn the dial to a desired angle to select a playback speed from ±1/20 to 17 times normal speed. The speed at the center position is 0, corresponding to a still picture.
JOG mode	Rotate the dial at a desired speed to select any speed between 0 and ±1 times normal speed. Unlike in SHUTTLE mode, you will not feel any detents as you rotate the dial.

The tape running direction is indicated by the direction indicators.

- ▷ : lights when you rotate the dial clockwise to run the tape forward.
- ◁ : lights when you rotate the dial counterclockwise to run the tape in reverse.
- □ : lights while the dial is stopped.

Dial menu operation

Set the counter display switch to DIAL MENU.

Rotate the dial while holding down the MENU button or the DATA button to set the characters or numbers on the display.

For more information about the dial menu operation, see "System setup from Menu" chapter 2.

13 REMOTE/LOCAL switch

Set this switch to control the unit either locally or from the equipment connected to the REMOTE 1 connector on the rear panel.

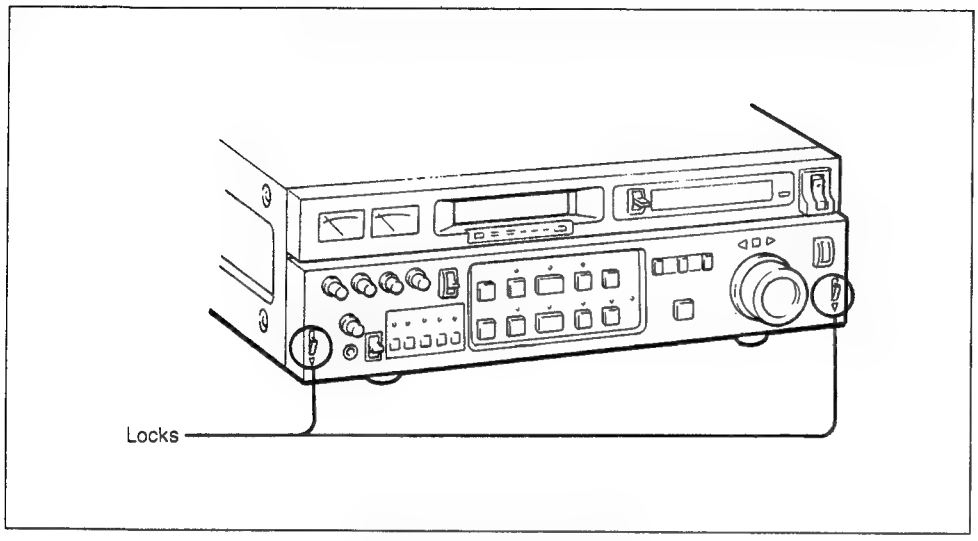
REMOTE: The unit is controlled from an external unit connected to the 9-pin REMOTE 1 connector on the rear panel. Setting this switch to REMOTE disables all the tape transport buttons on the control panel, except for the STOP and EJECT buttons.

LOCAL: The unit is controlled from its control panel.

1-2-2. Sub Panel (Inside the Control Panel)

How to open and tilt the lower control panel

To change the settings of the switches on the sub-panel, inside the control panel, open the lower control panel as illustrated. You can tilt the control panel up through 30°, 60° or 90°.

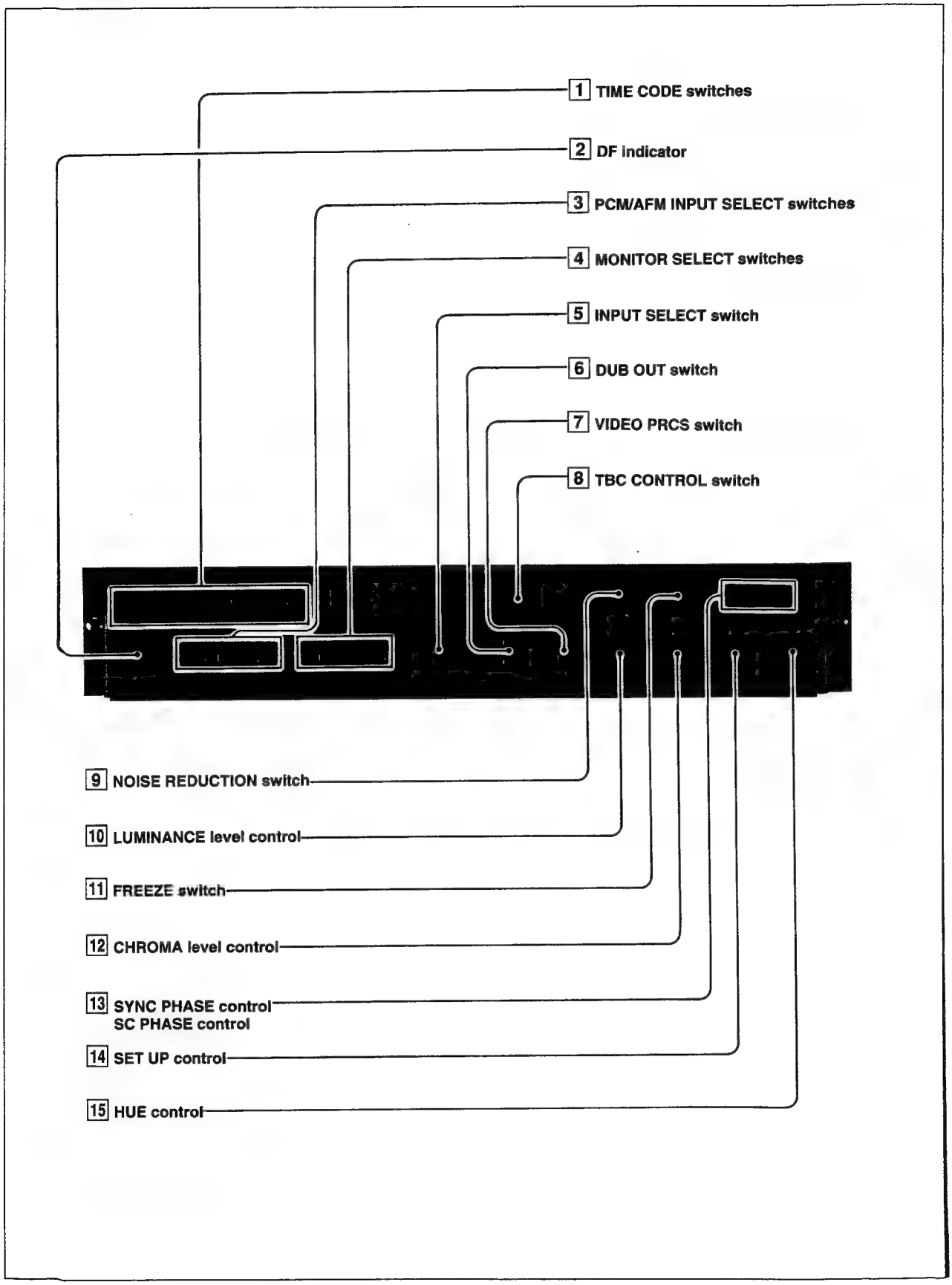


Opening the lower control panel

1 Push down the locks on the both sides simultaneously so that the lower half of the front panel moves out.

2 Tilt the panel up and lock it at 30°, 60° or 90°. Check that both sides are firmly locked.

(Sub Panel)



Sub panel

1 TIME CODE switches

EXT/INT (external/internal) switch

EXT: Set the switch to this position to use the input from the TIME CODE IN connector. This is only available when the EVBK-100 SMPTE time code interface kit (accessory) is installed.

INT: Set the switch to this position to use the built-in time code generator.

Factory setting: INT

REGEN (regenerate)/PRESET switch

REGEN: Regenerate the initial setting for the built-in time code generator, using the input external time code or the played back time code read by the built-in time code reader.

PRESET: Preset the initial value for the time code generator, using the control panel or the value input from a remote control unit connected through the 9-pin REMOTE 1 connector.

Factory setting: PRESET

FREE RUN/REC RUN (generator operation mode) switch

FREE RUN: The time code advances regardless of the unit's operating mode, until the power is turned off.

REC RUN: The time code advances only during recording. This setting is valid only if the EXT/INT switch is set to INT, and the REGEN/PRESET switch is set to PRESET.

Factory setting: FREE RUN

U BIT/TIME (user bit/8-mm time code display) switch

This switch determines whether the time code or user bits will be displayed in the time counter display.

U BIT: Set the switch to this position to display the user bits on the tape, read by the built-in time code reader or during recording.

TIME: Set the switch to this position to display the 8-mm time code on the tape read by the built-in time code reader or during recording.

Factory setting: TIME

2 DF (drop frame) indicator

Lights when the recorded/played-back 8-mm time code is set in drop frame mode.

3 PCM/AFM INPUT SELECT switches

Selects the recording method for the audio signal input to each channel of the four AUDIO INPUT connectors.

PCM CH1/2 CH3/4 switch

Selects the channel for PCM recording. Set the switch to CH1/2 when recording signals input to the AUDIO INPUT CH-1/L and CH-2/R connectors. Set the switch to CH3/4 when recording signals input to the AUDIO INPUT CH-3/L and CH-4/R connectors.

AFM CH3/4 CH1/2 switch

Selects the channel for AFM recording. Set the switch to CH3/4 when recording signals input to the AUDIO INPUT CH-3/L and CH-4/R connectors. Set the switch to CH1/2 when recording signals input to the AUDIO INPUT CH-1/L and CH-2/R connectors.

4 MONITOR SELECT switches

Select the sound to be output from the PHONES connector on the front panel and the MONITOR connectors on the rear panel.

PCM/AFM switch

PCM: Set the switch to this position to monitor PCM-recorded sound.

AFM: Set the switch to this position to monitor AFM-recorded sound.

Factory setting: PCM

CH-1/MIX/CH-2 switch

Selects the sound to be output from the PHONES connector and MONITOR connectors. The recording mode of the output sound depends on the setting of the PCM/AFM switch.

CH-1: The sound recorded on the PCM channel 1 or the AFM left channel

MIX: Mixed sound recorded on the PCM channel 1 and 2 or on the AFM left and right channels

CH-2: The sound recorded on the PCM channel 2 or the AFM right channel.

5 INPUT SELECT switch

Selects the video signal to be recorded.

LINE: Set the switch to this position to record the video signal input via the VIDEO IN connector.

S-VIDEO: Set the switch to this position to record the video signal input via the S-VIDEO connector.

DUB: Set the switch to this position to record the video signal input via the DUB IN (8-mm) connector.

6 DUB (dubbing) OUT switch

Set this switch according to the type of the VTR connected to the DUB OUT connector.

8 mm: Set the switch to this position to connect the EVO-9850.

U-CONV: Set the switch to this position to connect a conventional (not SP system) U-matic VTR, or when using conventional U-matic cassettes in an SP system U-matic VTR.

SP: Set the switch to this position to connect an SP system U-matic VTR or when using the SP cassettes.

7 VIDEO PRCS (process) switch

Selects the video signal characteristics during playback, editing and dubbing.

EDIT: Set the switch of the player EVO-9850 to this position when editing and when dubbing. The video signal is automatically adjusted to obtain the optimum dubbing picture quality.

NORM: Set the switch to this position when monitoring the played back picture.

Refer to the NOTE 1 on page 1-14.

8 TBC (time base corrector) CONTROL switch

LOCAL: Set the switch to this position to control the time base corrector from the sub-panel.

REMOTE: Set the switch to this position to control the time base corrector from a BVR-55 remote control unit (not supplied).

9 NOISE REDUCTION switch

Selects the noise reduction level of the digital noise reduction circuits during playback.

OFF: The digital luminance/chrominance noise reduction circuits do not work.

1: Low chrominance noise reduction level

2: High chrominance noise reduction level

The luminance noise reduction circuit can be turned on/off by using the dial menu 228.

Refer to the NOTE 1 on page 1-14.

10 LUMINANCE level control

Adjusts the luminance output level within a range of ±3dB with this control.

11 FREEZE switch

ON: Set the switch to this position to monitor a frame of the moving picture as a still picture during playback. The frame being played back when you set the switch to ON is sent to memory and output as a still picture.

OFF: Set the switch to this position to release the FREEZE mode and output the playback picture again.

12 CHROMA level control

Adjusts the chroma output level within a range of ±3dB.

13 SYNC PHASE control

SC (subcarrier) PHASE control

Use these controls when you need to synchronize the unit's output phase with a reference signal, or when you wish to achieve special effects such as fades or dissolves when using the unit with an editing control unit and other VTRs.

SYNC PHASE control

Adjusts the output sync phase within -1 to +3µs with respect to the reference signal input to the unit.

SC PHASE control

Adjusts the output subcarrier phase within 360 degrees with respect to the reference signal input to the unit.

14 SET UP control

Adjusts the setup level of the output video signal from 0 to 15 IRE.

15 HUE control

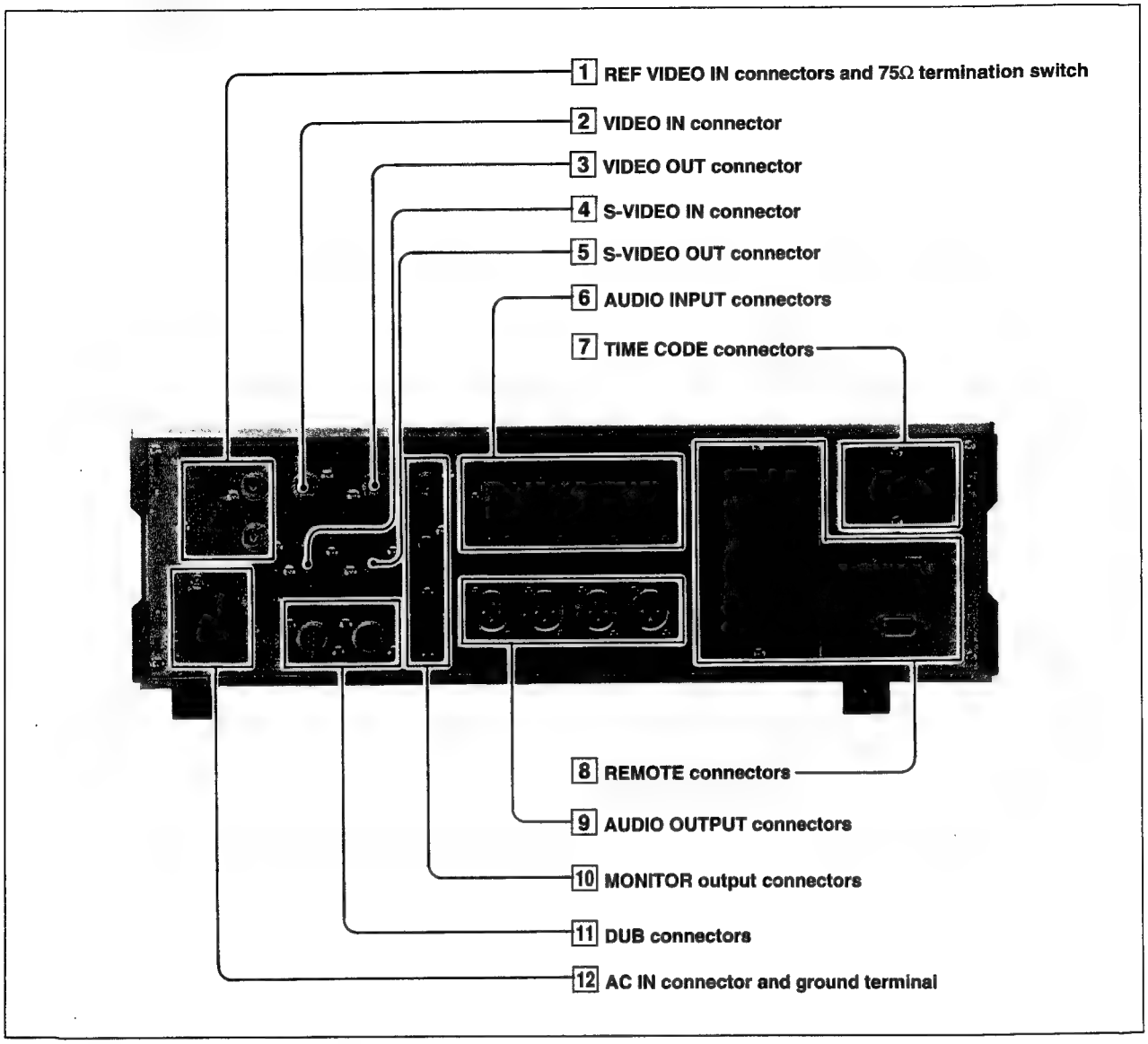
Adjusts the output hue (burst and chroma relative phase) within ±30 degrees.
The HUE control does not adjust the burst phase of the output signal relative to that of the reference signal.

Note 1) Selection of Noise Reduction Mode by Switch Setting

Status of YNR, CNR and Luminance Enhancer of a VTR is determined by the settings of VIDEO PRCS (PROCESS) switch, NOISE REDUCTION switch and dial menu 228/229 (YNR/ENHANCER), as shown below.

SWITCH & MENU SETTING				VTR MODE		
SWITCH		DIAL MENU				
VIDEO PRCS	NOISE REDUCTION	YNR	ENHANCER	YNR	CNR	LUMINANCE ENHANCER
NORMAL	2	ON	ON	ON	HIGH	ON
	1			ON	LOW	
	OFF			OFF	OFF	
	2	ON	OFF	ON	HIGH	OFF
	1			ON	LOW	
	OFF			OFF	OFF	
	2	OFF	ON	OFF	HIGH	ON
	1				LOW	
	OFF				OFF	
EDIT				OFF	OFF	OFF

1-2-3. Connector Panel (Rear)



Connector panel

1 REF (reference) VIDEO IN connectors (BNC type) and 75Ω termination switch
Connect the reference video signal. The second connector is used for loop-through output. When both connectors are used for a bridge connection, set the 75Ω termination switch to OFF. Otherwise, set the switch to ON.

2 VIDEO IN connector (BNC type)
Connect composite video signals.

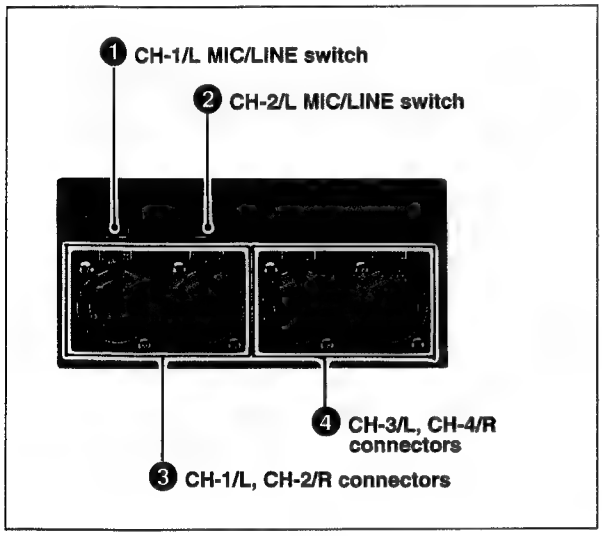
3 VIDEO OUT connector (BNC type)
Connect to a VTR or monitor video input connector to output composite video signals.

4 S-VIDEO IN connector (4-pin)
Input separate Y and C signals by connecting to the S-VIDEO output connector of another VTR or video equipment.

5 S-VIDEO OUT connector (4-pin)
Outputs separate Y and C signals. Can be connected to any VTR or monitor with an S-VIDEO input connector.

6 AUDIO INPUT connectors

The unit is equipped with four audio input connectors. When there are two audio source systems, connect each system to CH-1/L and CH-2/R, and to CH-3/L and CH-4/R respectively. You can select the audio recording method (PCM or AFM) for channels 1 and 2, and channels 3 and 4 by setting the INPUT SELECT switch on the sub panel.



Audio input connectors

1 CH-1/L MIC (microphone)/LINE switch

Selects the signal input to the CH-1/L connector.

MIC: Set the switch to this position to connect a microphone.

LINE: Set the switch to this position to connect a player VTR or audio equipment.

2 CH-2/L MIC (microphone)/LINE switch

Selects the signal input to the CH-2/R connector.

MIC: Set the switch to this position to connect a microphone.

LINE: Set the switch to this position to connect a player VTR or audio equipment.

3 CH-1/L, CH-2/R connectors (XLR 3-pin)

Connect audio signals from a player VTR, audio equipment or microphones.

4 CH-3/L, CH-4/R connectors (XLR 3-pin)

Connect audio signals from a player VTR or audio equipment.

7 TIME CODE connectors (accessories)

Use these connectors to input and output the LTC of SMPTE time code when the EVBK-100 SMPTE time code interface kit is installed.

TIME CODE IN connector (BNC type)

Inputs the LTC from the external time code generator or another VTR. The built-in 8-mm time code generator is locked to the input LTC.

TIME CODE OUT connector (BNC type)

Outputs the LTC, converted from the 8-mm time code by the unit .

8 REMOTE connectors

TBC REMOTE connector (15-pin)

To remotely control the built-in time base corrector, connect the BVR-55 remote control unit (not supplied) to this connector.

Note

Always turn off the unit's power before connecting remote control equipment to the TBC REMOTE connector.

REMOTE 1 connector (9-pin)

Connect a Sony editing control unit such as an RM-450 using a 9-pin remote control cable, to perform editing.

REMOTE 2 connector (33-pin) (not supplied)

Connect a Sony editing control unit with a 33-pin remote connector such as the RM-440 when the BKU-703A 33-pin editing interface (accessories) is installed.

9 AUDIO OUTPUT connectors

PCM CH-1/L, CH-2/R (PCM audio output) connectors (XLR 3-pin)
Outputs the audio signal recorded on the PCM tracks.

AFM CH-3/L, CH-4/R (AFM audio output) connectors (XLR 3-pin)
Outputs the audio signal recorded on the AFM tracks.

10 MONITOR output connectors

VIDEO output connector (BNC type)
Connect to the video input connector of a color monitor. Information superimposed on a picture in dial menu operation mode will also be output.

AUDIO output connector (phono jack)
Outputs the audio signal selected using the MONITOR SELECT switch on the sub panel.

TV monitor connector (8-pin)
Connect to the VTR connector of a color video monitor, using the 8-pin connecting cable (not supplied), to output audio and video signals, including data superimposed with the dial menu.
During playback, you will hear the sound recorded on the channel selected using the MONITOR SELECT switch.

11 DUB (dubbing input/output) connectors

DUB IN (8 mm) connector (7-pin)
Use to input the video signal to be dubbed from another EVO-9850 Hi8 video recorder.
Connect to the DUB OUT connector of the other EVO-9850 by using the 7-pin dubbing cable (accessory).

DUB OUT (8 mm/U-matic) connector (7-pin)
Outputs the signal selected using the DUB OUT switch on the sub panel.
Connect to the DUB IN connector of the other EVO-9850 or the DUB IN connector of a U-matic VTR by using the 7-pin dubbing cable (accessory).

12 AC IN connector and ground terminal

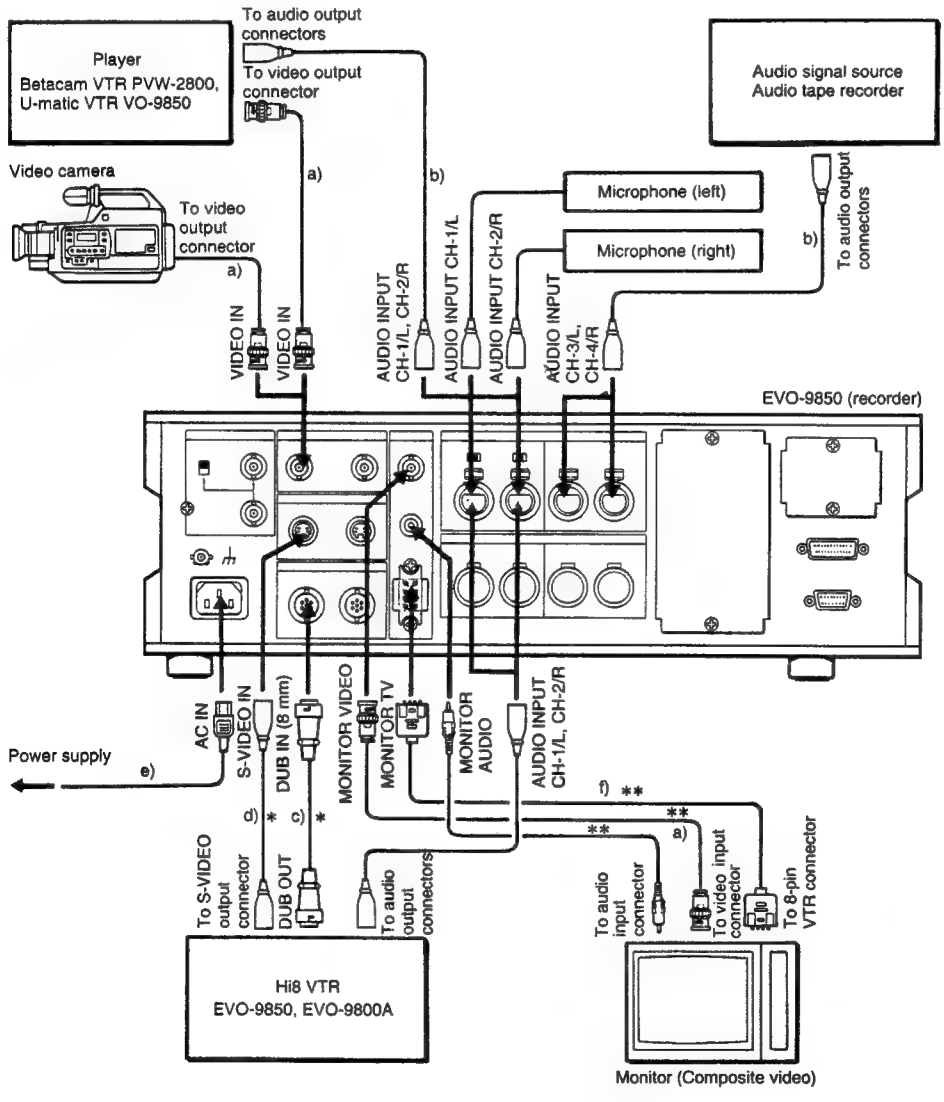
AC IN: Connect an AC power source using the AC power cord (supplied).
⏚ **(ground):** Connect to ground line.

1-3. CONNECTIONS

Basic Connections

The diagrams in this subsection show how to connect input and output signals using the appropriate cable, to the connectors on the unit's connector panel. Use these diagrams as a guide to connect the necessary signals to and from the video equipment you intend to use for actual recording and playback.

Connections for recording



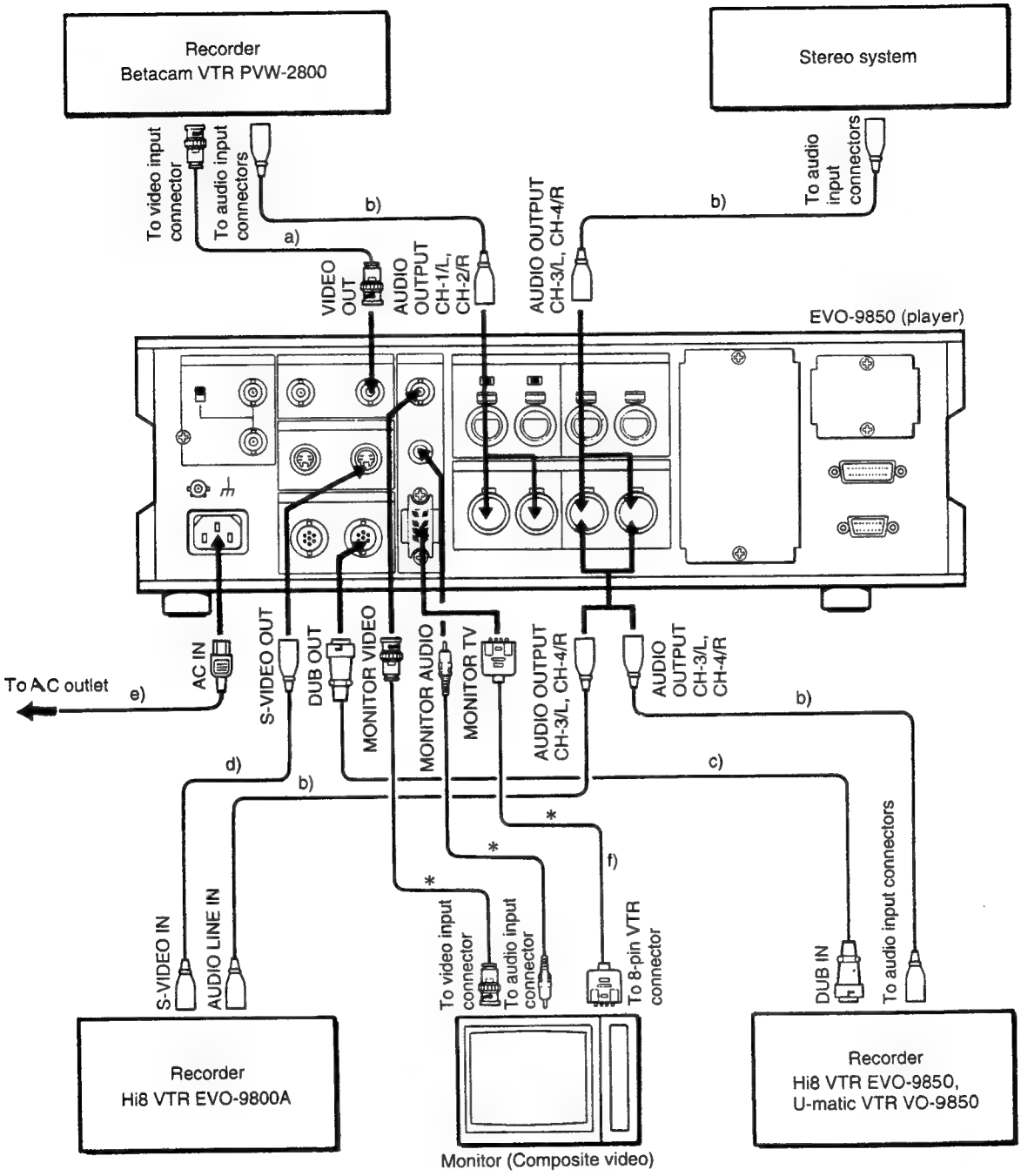
* When you connect another EVO-9850, use either.

** When connection is made with the 8-pin monitor cable, it is not necessary to make connections with 75-ohm coaxial cable and two Cannon XLR cables.

a) 75-ohm coaxial cable with BNC connectors
b) Two Cannon EC-10XLR cables
c) 7-pin dubbing cable (optional)
d) DIN 4-pin cable YC-30V, SYC-2/5
e) Power cord (supplied)
f) 8-pin monitor cable

Connections for recording

Connections for playback

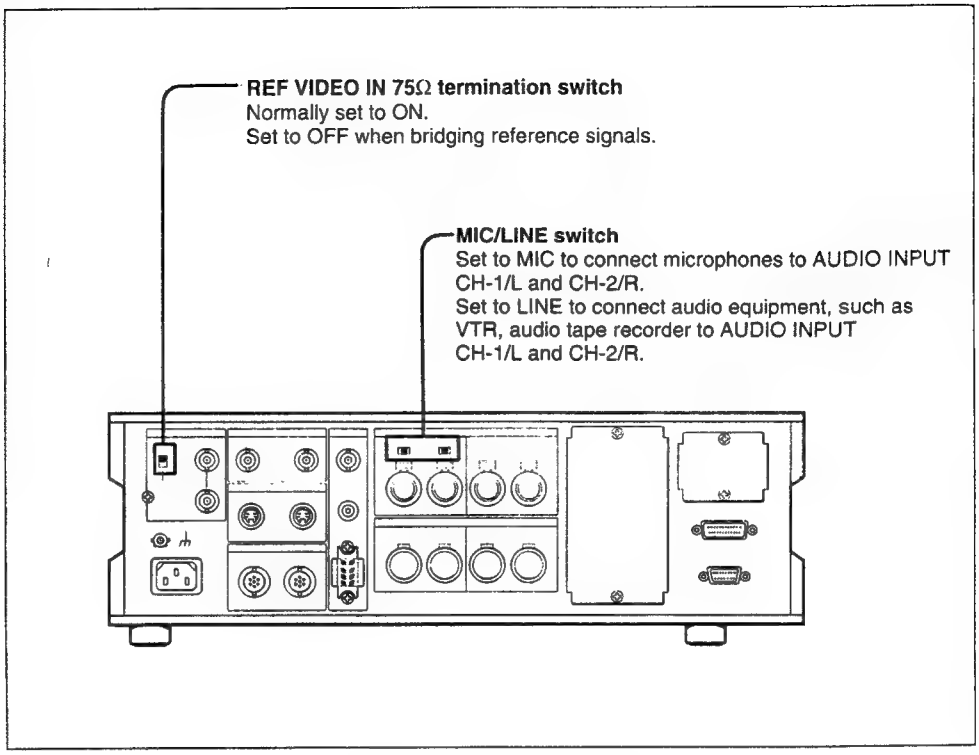


* When connection is made with the 8-pin monitor cable, it is not necessary to make connections with 75-ohm coaxial cable and two Cannon XLR cables .

a) 75-ohm coaxial cable with BNC connectors
b) Two Cannon EC-10XLR cables
c) 7-pin dubbing cable (optional)
d) DIN 4-pin cable YC-30V, SYC-2/5
e) Power cord (supplied)
f) 8-pin monitor cable

Connections for playback

Connector panel switch settings



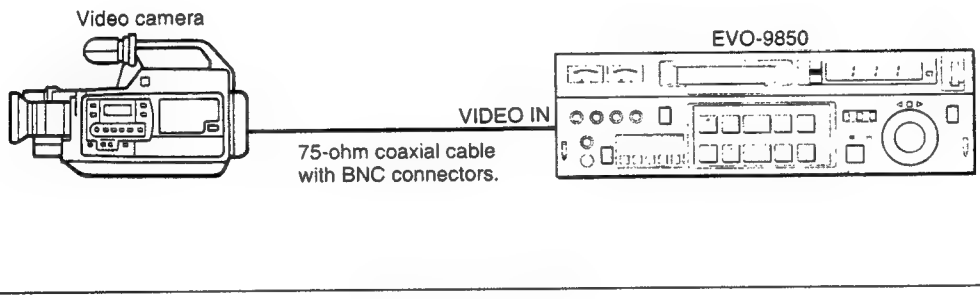
Connector panel switch settings

Editing System Connections

Refer to the diagrams below, and to the user manuals for the VTRs and other video equipment constituting your system, when connecting input and output signals. When using two or more VTRs, a reference signal is needed to synchronize the unit's built-in time base corrector.

For more information, see "Reference Signal Connections" on page 1-24.

Manual editing system using the preroll button

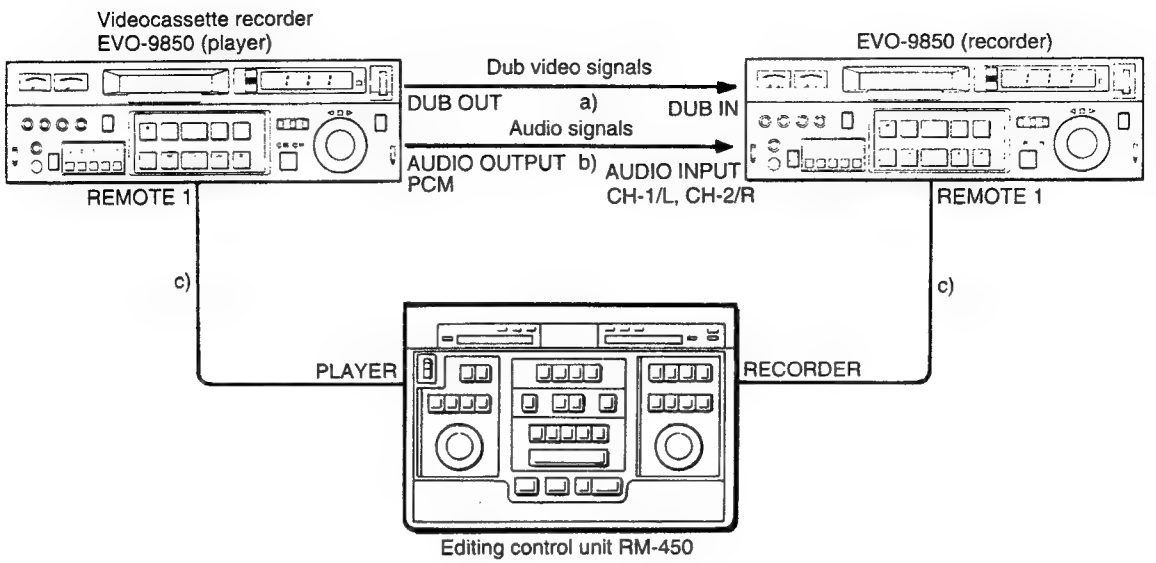


Manual editing system

EVO-9850 switch setting

INPUT SELECT switch → LINE
MODE SELECT switch → EDIT

Cut editing system 1 (EVO-9850 → EVO-9850)



a) 75-ohm coaxial cable with BNC connectors
b) Cannon EC-10XLR cables
c) 9-pin remote control cable RCC-5G/10G/30G (5 m/10 m/30 m)

Cut editing system 1

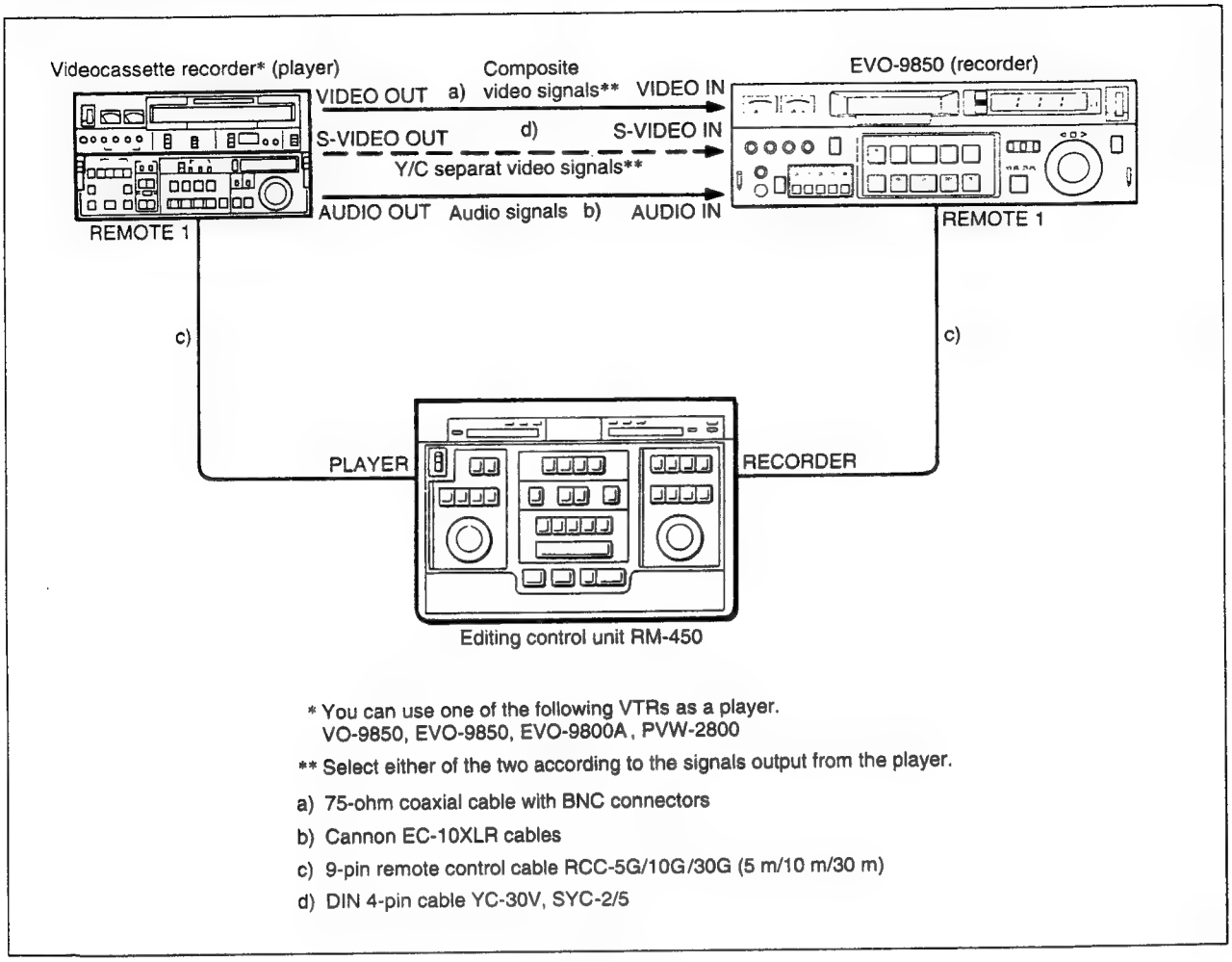
EVO-9850 switch settings (recorder)

INPUT SELECT switch → DUB
VIDEO PRCS switch → NORM
PCM/AFM INPUT SELECT switch → CH1/2
MIC/LINE switch → LINE
MODE SELECT switch → EDIT

EVO-9850 switch settings (player)

VIDEO PRCS switch → EDIT
DUB OUT switch → 8 mm
MODE SELECT switch → NORMAL

Cut editing system 2 (Hi8 VTR/Betacam VTR/U-matic VTR → EVO-9850)



* You can use one of the following VTRs as a player.
VO-9850, EVO-9850, EVO-9800A, PVW-2800

** Select either of the two according to the signals output from the player.

a) 75-ohm coaxial cable with BNC connectors

b) Cannon EC-10XLR cables

c) 9-pin remote control cable RCC-5G/10G/30G (5 m/10 m/30 m)

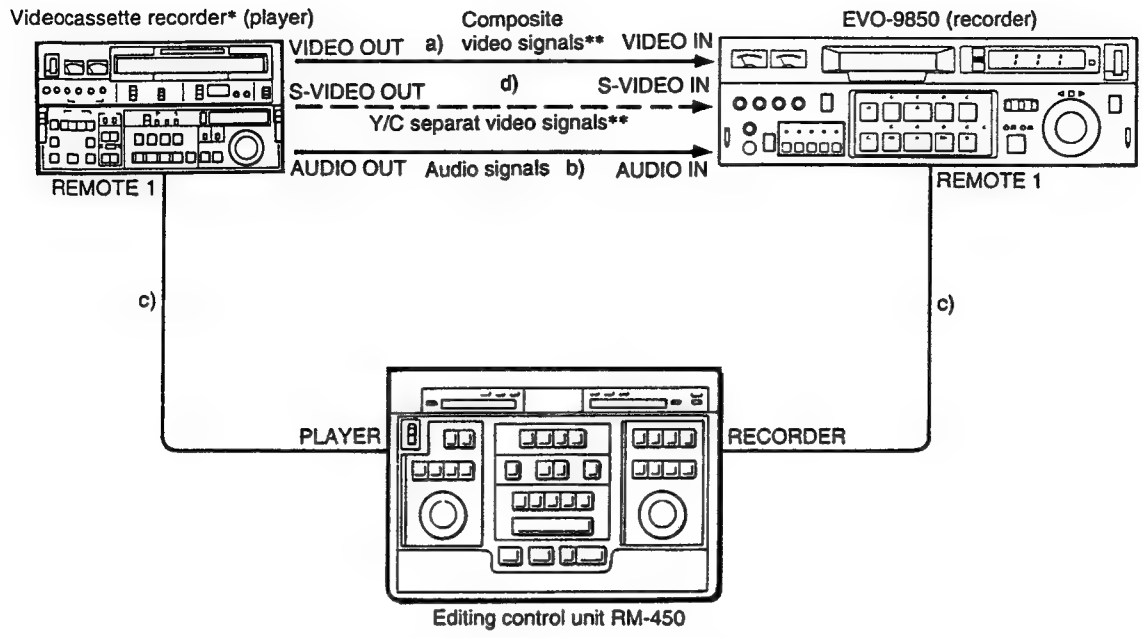
d) DIN 4-pin cable YC-30V, SYC-2/5

Cut editing system 2

EVO-9850 switch settings (recorder)

INPUT SELECT switch → LINE or S-VIDEO
VIDEO PRCS switch → NORM
MODE SELECT switch → EDIT
PCM/AFM INPUT SELECT switch →
PCM — CH1/2 or CH3/4
AFM — CH1/2 or CH3/4

Cut editing system 2 (Hi8 VTR/Betacam VTR/U-matic VTR → EVO-9850)



* You can use one of the following VTRs as a player.
VO-9850, EVO-9850, EVO-9800A, PVW-2800

** Select either of the two according to the signals output from the player.

a) 75-ohm coaxial cable with BNC connectors

b) Cannon EC-10XLR cables

c) 9-pin remote control cable RCC-5G/10G/30G (5 m/10 m/30 m)

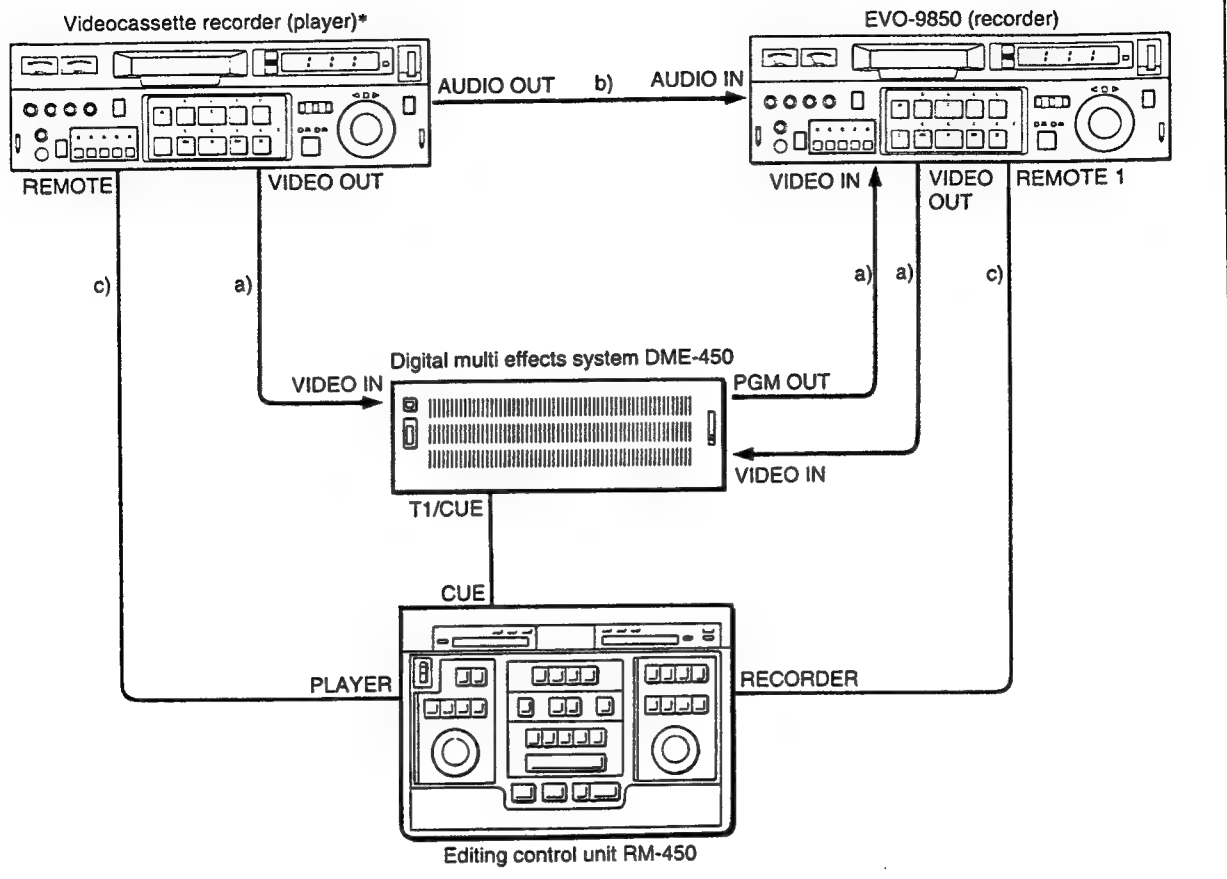
d) DIN 4-pin cable YC-30V, SYC-2/5

Cut editing system 2

EVO-9850 switch settings (recorder)

INPUT SELECT switch → LINE or S-VIDEO
VIDEO PRCS switch → NORM
MODE SELECT switch → EDIT
PCM/AFM INPUT SELECT switch →
PCM — CH1/2 or CH3/4
AFM — CH1/2 or CH3/4

Two-VTR editing system (Cut editing with digital multi effects)



* You can use one of the following VTRs as a player.
VO-9850, EVO-9850, EVO-9800A, PVW-2800

a) 75-ohm coaxial cable with BNC connectors

b) Cannon EC-10XLR cables

c) 9-pin remote control cable RCC-5G/10G/30G (5 m/10 m/30 m)

Two-VTR editing system

EVO-9850 switch settings (recorder)

INPUT SELECT switch → LINE
VIDEO PRCS switch → NORM
MODE SELECT switch → EDIT
PCM/AFM INPUT SELECT switch →
PCM — CH1/2 or CH3/4
AFM — CH1/2 or CH3/4

Reference Signal Connections

To obtain the required picture when you wish to connect two VTRs for editing, the VTRs and the editing control unit must be synchronized with each other. The time base correctors normally require an external reference signal. This unit contains a built-in sync signal generator, so that you can edit even in locations where an external reference signal is not available. The output from the sync signal generator is supplied to the unit's built-in time base corrector and to the servo circuits. The unit's reference signal is changed depending on the input signal and the setting of the MODE SELECT switch of the unit.

Sync system

The unit synchronizes with the external sync signal when the video signal is input from VIDEO IN, S-VIDEO IN or DUB IN connector or sync signal is input from REF VIDEO IN connector. The unit synchronizes with the internal sync signal generated by the built-in sync signal generator when neither external sync signal nor video signal is supplied. The reference signal is changed depending upon the setting of the MODE SELECT switch, input signals and the VTR operation mode.

Automatic selection of reference signal

VTR operation mode / MODE SELECT switch setting / Input signal		Recording	Playback	
		NORMAL EDIT	EDIT	NORMAL
Video signal	External sync signal			
Yes	Yes	Video	* External sync	External sync
Yes	No	Video	** Internal sync	Internal sync
No	Yes	External sync		
No	No	Internal sync		

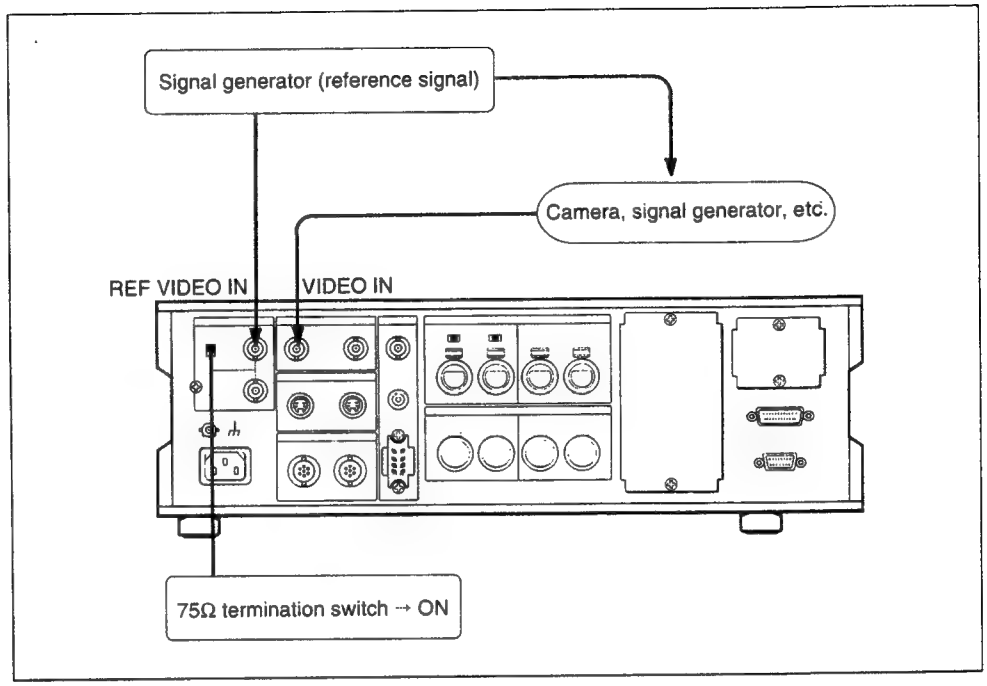
Note:

* When operating in this mode, it is required that tke Video Signal is locked to the External Sync Signal.

** In this mode, a reproduced picture may become unstable. It is required to feed an External Sync Signal or to change the mode from EDIT to NORMAL for correction.

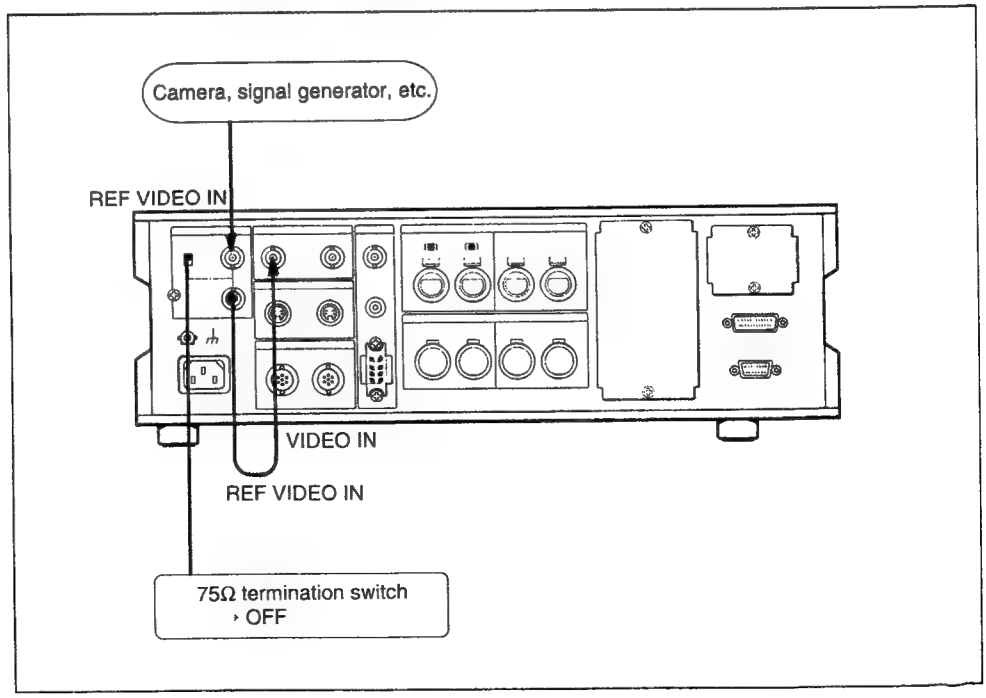
Recording from a camera, signal generator, etc.

Example 1: When sending the reference signal to both the VTR and a camera



Sending the reference signal to the VTR and camera

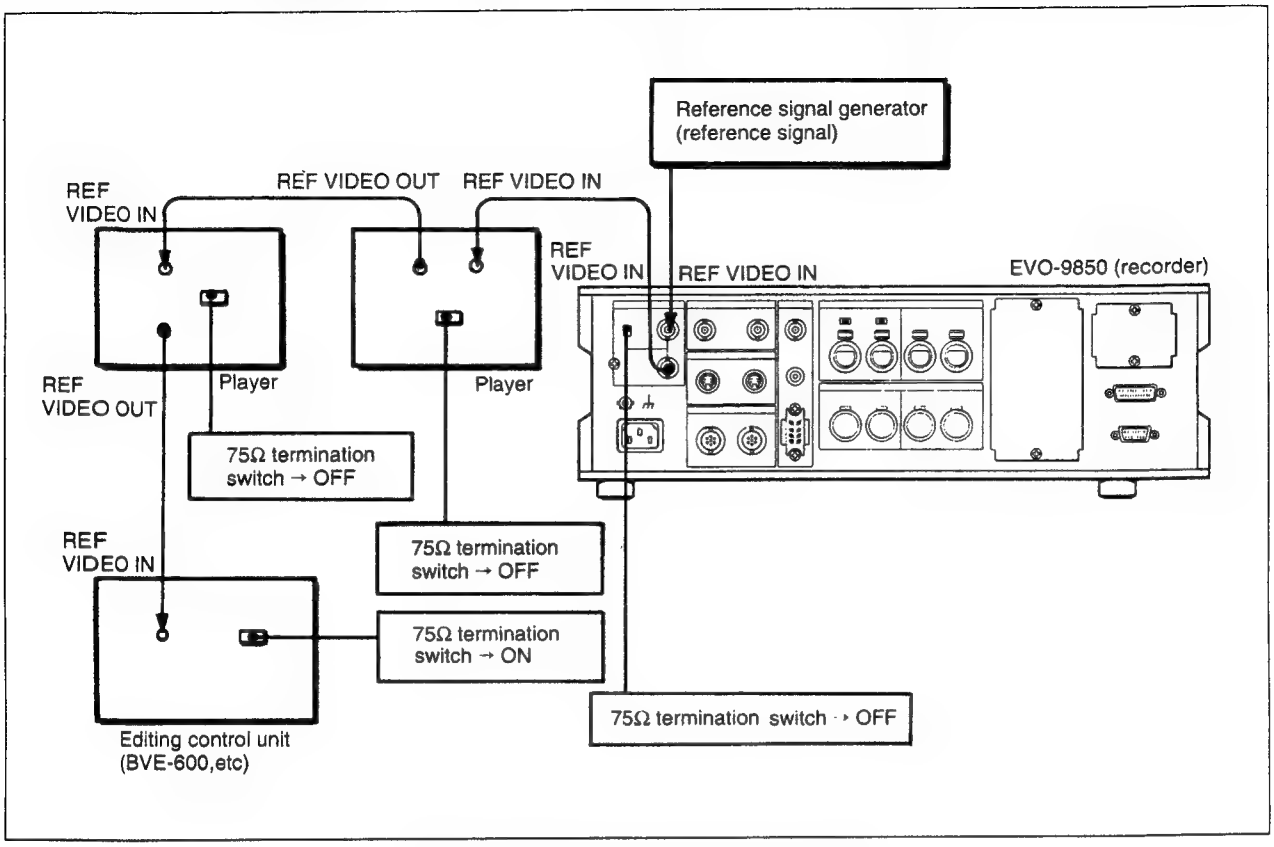
Example 2: When using the video signal from a camera and so on as a reference signal



Using the camera signal as the reference signal

Recording from a VTR

Example 3: A/B roll editing



Reference signal connection for A/B roll editing

1-4. CASSETTES

Please use the following 8-mm video system cassettes tapes and We highly recommend you use Hi8 cassettes tape for bussines use.

Hi8 cassettes for business use: E6-HMEX, P6-HMPX

The above cassettes are designed for business use and offer the best drop-out level.

Hi8 Cassettes: E6-HME, P6-HMP

Standard 8-mm cassettes: P6-MP series

We highly recommend you use P6-HMPX series tape for editing application because of durability. Don't use home-use 150 minutes cassettes tapes.

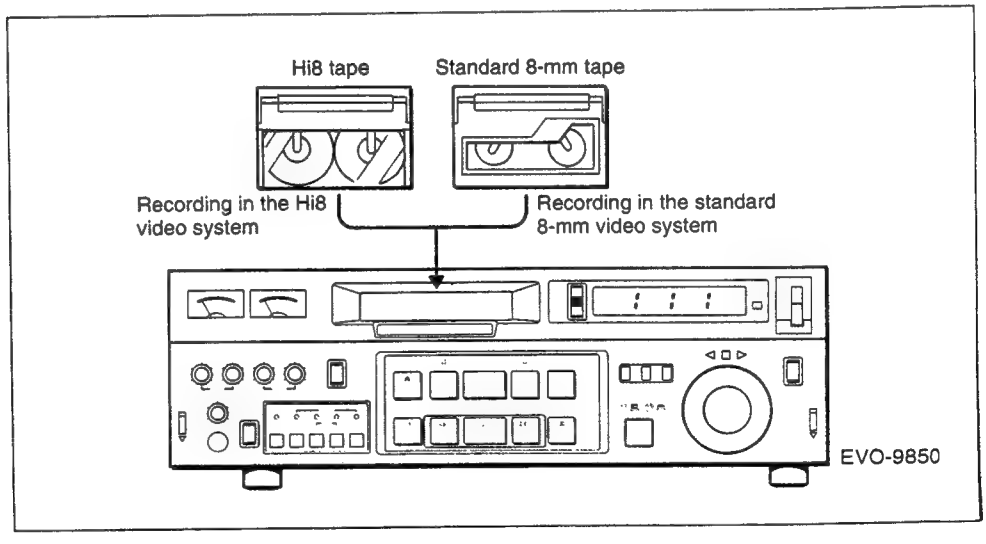
Cassettes and automatic switching of recording and playback

The unit differentiates between Hi8 cassettes and standard 8-mm cassettes by sensing the detection holes on the Hi8 cassettes. It automatically switches recording and playback mode as shown below.

Recording

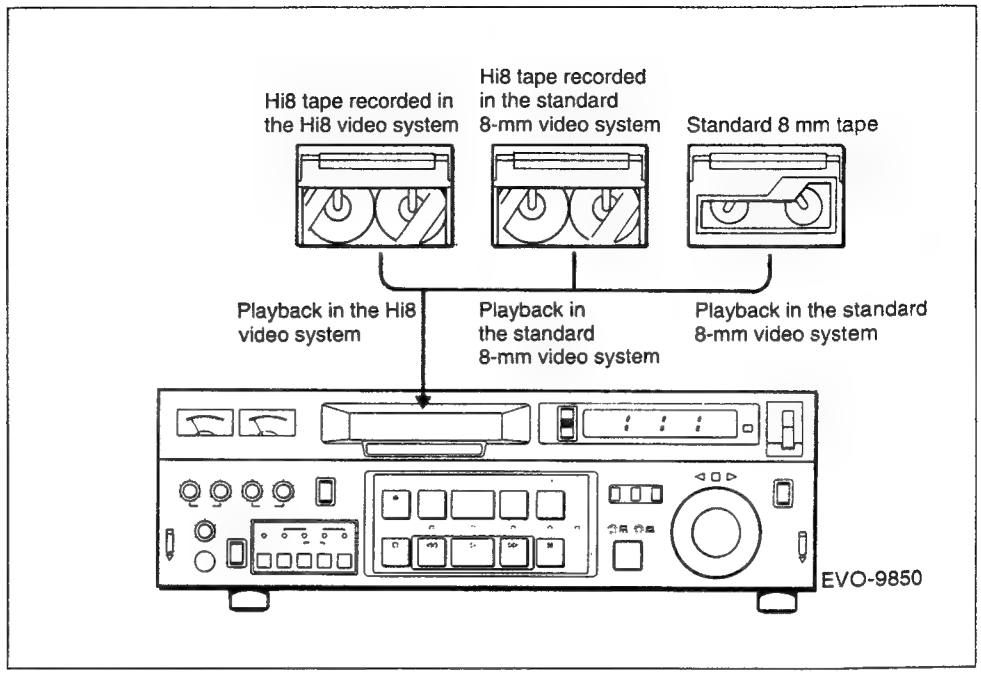
When you use a Hi8 cassette for recording, the unit senses the detection holes in the cassette shell, and automatically performs recording in SP (standard play) mode of the Hi8 video format.

When you use a standard 8-mm tape, the unit performs recording in the standard 8-mm video format.



Playback

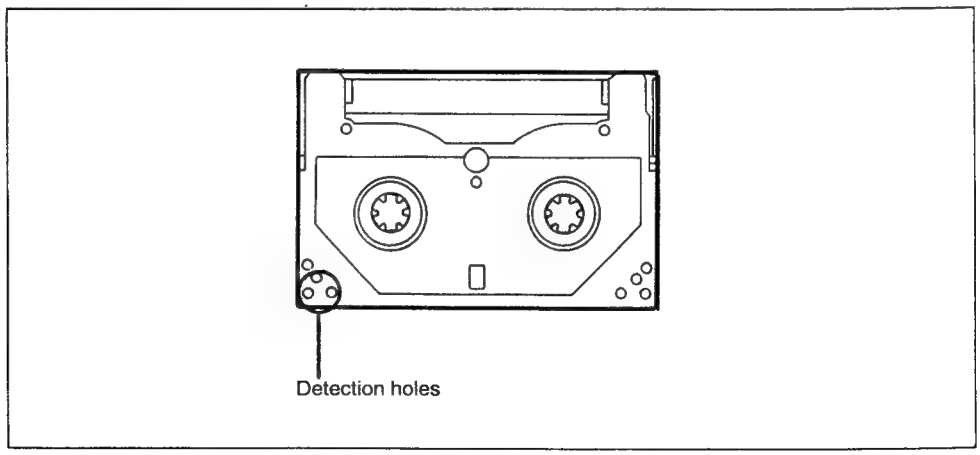
The unit detects the recording format by verifying the recording signal, and plays back the tape in the appropriate mode.



The Hi8 indicator on the front panel lights when a tape recorded in Hi8 video format is played back.

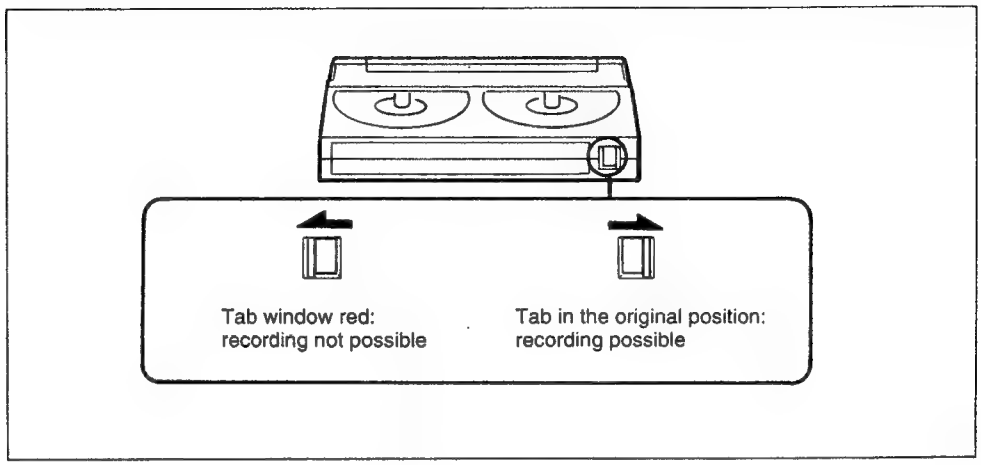
Hi8 cassettes

New Hi8 cassettes with high durability were specially developed for Hi8 video system recording/playback. They feature characteristics well suited the Hi8 video system. Hi8 cassettes feature a detection hole on the bottom of the cassette shell to automatically set Hi8 VTRs to Hi8 video format recording.



Preventing Accidental Erasure

When you record onto a recorded cassette, the previously recorded material is erased. If you want to safeguard the material recorded on a cassette, slide the tab on the rear of the cassette to the left, so that the tab window is red. Now, the cassette can not be used for recording, even if you press the REC button.

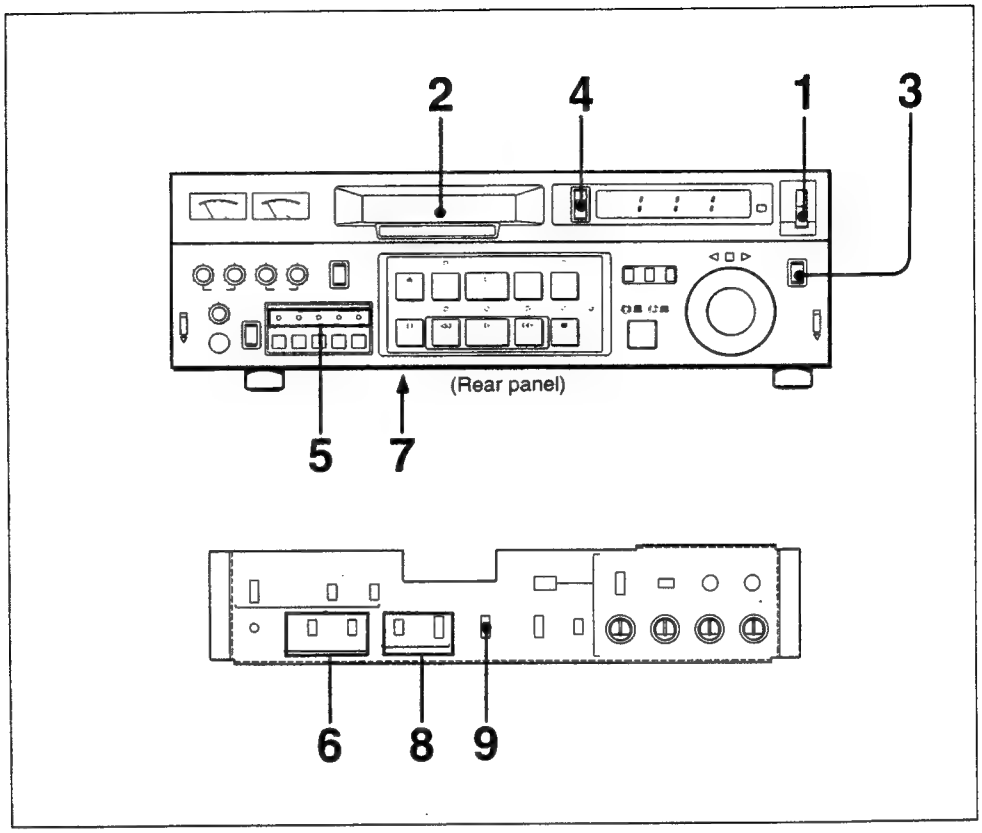


Preventing accidental erasure

When recording, check that the tab is set to the original position. If cassette that has its tab moved is inserted, a picture appears on the monitor in EE mode. However, the unit does not enter recording mode.

Preparing for Recording

Prepare to record as follows.



Preparing for recording

1 Set the POWER switch to ON.

2 Insert a cassette.
For details, see Chapter 3 "Inserting and Ejecting Cassettes" on page 3-25(E).

3 Set the REMOTE/LOCAL switch to LOCAL.

4 Set the time counter display switch to the time data you wish to display.
COUNTER: Displays the amount of tape travel in hours, minutes, seconds and frames.
Press the RESET button to reset the display to 0:00:00:00.
TC: Display the 8-mm time code.

5 Make sure that the following indicators are off.
- Indicator above the ASSEMBLE button
- Indicators above the INSERT buttons

6 Set the PCM/AFM INPUT SELECT switch to the audio signal you wish to record.
For details, see "Selecting the audio recording system" on page 1-31.

7 Set the MIC/LINE switch of the AUDIO INPUT CH-1/L CH-2/R connectors to the audio signal you wish to input.

MIC: Set the switch to this position to record the audio signal from the microphone connected to the AUDIO INPUT CH-1/L CH-2/R connectors.

LINE: Set the switch to this position to record the audio signal from a VTR player or audio equipment.

8 Set the MONITOR SELECT switch to the audio signal you wish to monitor.
For details, see "Selecting audio input signal to monitor" on page 1-33.

9 Set the INPUT SELECT switch to the video signal you wish to record as follows.

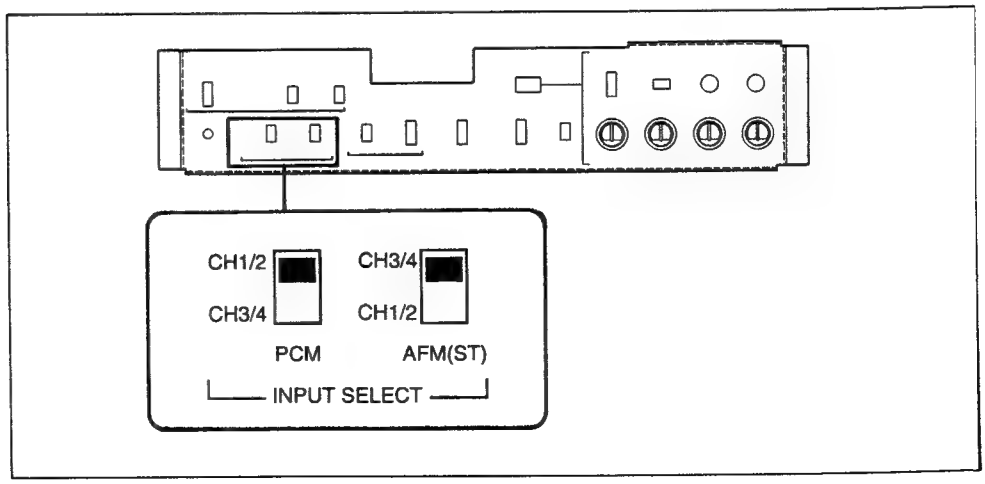
Input signal	Input connector	Switch setting
Composite video	VIDEO IN	LINE
Separate Y and C signals	S-VIDEO IN	S-VIDEO
Dub video signal for 8-mm VTR	DUB IN (8 mm)	DUB

Selecting the audio recording system

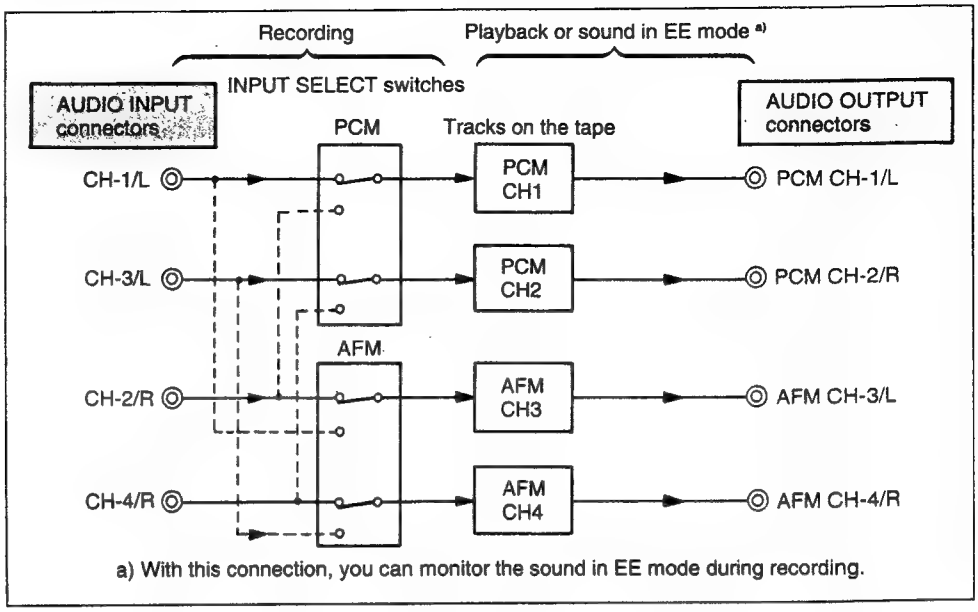
Audio signals can be recorded using either of two systems; matrix-stereo AFM recording and 2-channel PCM recording.
You can select which input audio signal is to be recorded with which recording system. You can also record a single audio input signal source with two different recording systems.
How to select the audio track to be recorded is explained below, with an example. The diagram below also shows the signal flow.

Example: To record two audio input signal sources with the AFM and PCM recording systems.

Set the PCM/AFM INPUT SELECT switch as shown below to record the audio signal input to AUDIO INPUT CH-1/L, CH-2/R with the PCM recording method and the audio signal input to AUDIO INPUT CH-3/L, CH-4/R with the AFM recording method.



PCM/AFM INPUT SELECT switch settings



Audio signal flow

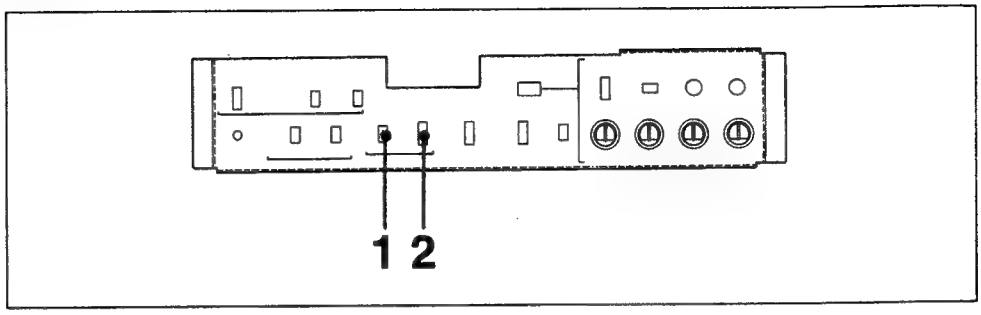
Recording audio from microphones

Connect microphones to the AUDIO INPUT CH-1/L and CH-2/R connectors. Set the MIC/LINE switch to MIC.

For an explanation of setting the PCM/AFM INPUT SELECT switch, see the above example.

Selecting the audio signal to monitor

You can monitor monaural sound through headphones or monitor's speakers while recording. Select the audio signal to monitor with the MONITOR SELECT switches.



Selecting the audio signal to monitor

1 Set the PCM/AFM switch of MONITOR SELECT to the recording system of the audio you wish to monitor.

PCM: Set the switch to this position to monitor the audio signal recorded on the PCM tracks.

AFM: Set the switch to this position to monitor the audio signal recorded on the AFM channels.

2 Set the CH-1/MIX/CH-2 switch to the channel you wish to monitor.

Switch setting	Audio signal output from PHONES, MONITOR TV and MONITOR AUDIO connectors	
	When you set the switch to PCM	When you set the switch to AFM
CH-1	Audio signal recorded on PCM track 1	Audio signal recorded on AFM left channel
MIX	Mixed audio signals from PCM tracks 1 and 2	Mixed audio signals from AFM left and right channels.
CH-2	Audio signals recorded on PCM track 2	Audio signals recorded on AFM right channel

Note

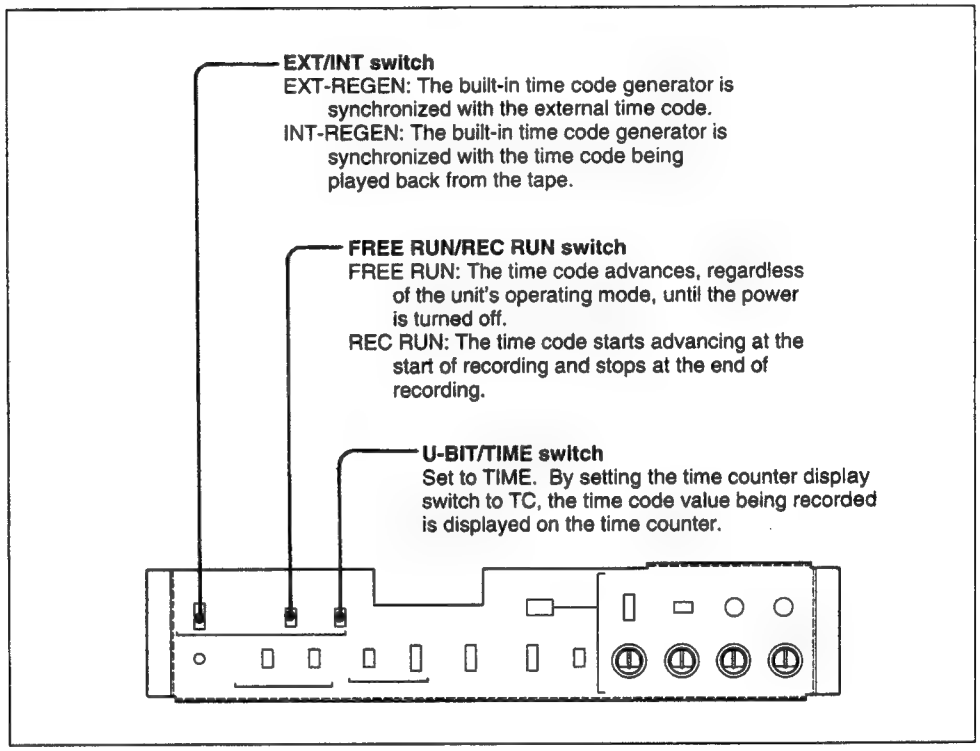
The audio signal from the AUDIO OUTPUT connectors is not affected by the setting of the MONITOR SELECT switches.

The AUDIO OUTPUT PCM CH-1/L and CH-2/R connectors output the audio signals recorded on PCM tracks 1 and 2, respectively.

The AUDIO OUTPUT AFM CH-3/L and CH-4/R connectors output the audio signals recorded on the AFM left and right channels, respectively.

Switch settings for recording 8-mm time code

The 8-mm time code is recorded simultaneously with the video and audio signals. To record the 8-mm time code with the video and audio signals or to record the 8-mm time code onto the tape onto which the video and audio signals have already been recorded, set the switches on the sub-panel as follows. This switch setting enables the recording of 8-mm time codes during editing.
To manipulate the switches on the sub-panel, raise the lower control panel to the horizontal position.



Switch settings for recording an 8-mm time code

Time code data can be set by the dial menu operation.
For details, see Chapter 2 "System Setup from Menu".

To set the user bits

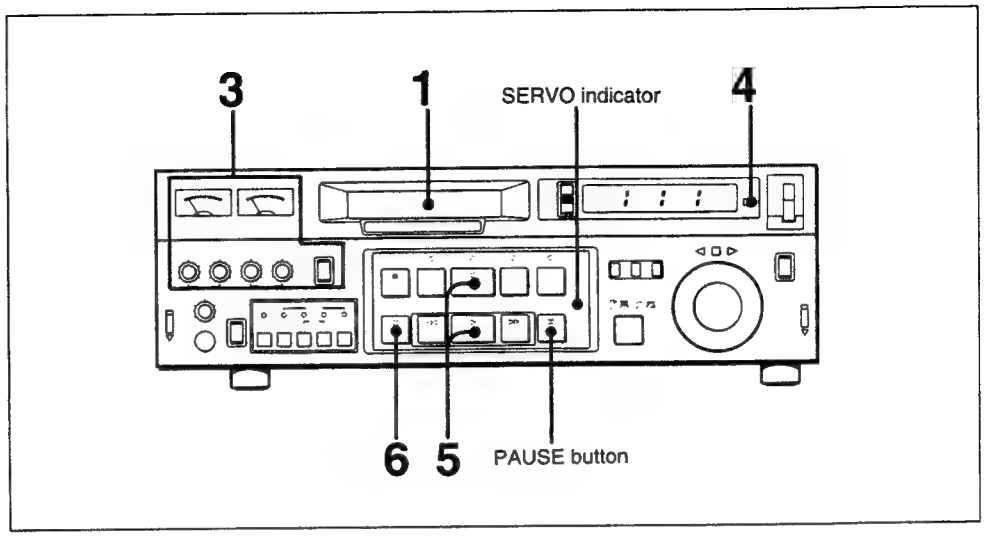
You can set the user bits using the basic menu function and also record the user bits to the tape.
For details, see Chapter 2 "System Setup from Menu".

To use the external time code

You can use the external time code input to the TIME CODE connectors by installing the EVBK-100 SMPTE time code interface kit (not supplied).

Recording Video and Audio Signals

Record video and audio signals as follows.



Recording video and audio signals

1 Insert the cassette, making sure that the tab on the rear of the cassette is in its original position and that the tab window is not red.

2 Prepare the program to be recorded.
To record a signal from another VTR: Set the other VTR to playback mode.
To record a signal from a video camera: Adjust the video camera.
The picture, in EE mode, appears on the monitor.

3 Adjust the audio recording level.
For details, see "Adjusting the audio recording level" on page 1-36(E).

4 Press the RESET button when the time counter display switch is set to COUNTER.
The value on the time counter display becomes "0:00:00:00".

5 While holding down the REC button, press the PLAY button to begin recording.
The SERVO indicator lights once the head rotation and tape speed stabilize.

6 Press the STOP button to stop recording.
The unit stops recording and the STOP indicator lights.
If recording continues to the end of the tape, the tape automatically rewinds to the beginning and then stops.

Adjusting the audio recording level

Adjust the audio recording level for each recording system and each channel by using the AUDIO LEVEL controls.

1 Set the METER SELECT switch to the recording system you wish to adjust.

PCM: Set the switch to this position to adjust the recording level of the audio signal to be recorded onto the PCM tracks.

AFM: Set the switch to this position to adjust the recording level of the audio signal to be recorded onto the AFM channels.

2 Adjust the audio signals of each channel by using the AUDIO LEVEL controls.

CH-1/3: Adjusts the recording level of the audio signal input to the AUDIO INPUT CH-1/L or CH-3/L connectors.

CH-2/4: Adjusts the recording level of the audio signal input to the AUDIO INPUT CH-2/R or CH-4/R connectors.

Adjust the AUDIO LEVEL controls such that the pointer of the level meter approaches 0 VU at maximum input level.

To stop the tape momentarily

Press the PAUSE button. To resume recording, press the PAUSE button again.

Long pause mode

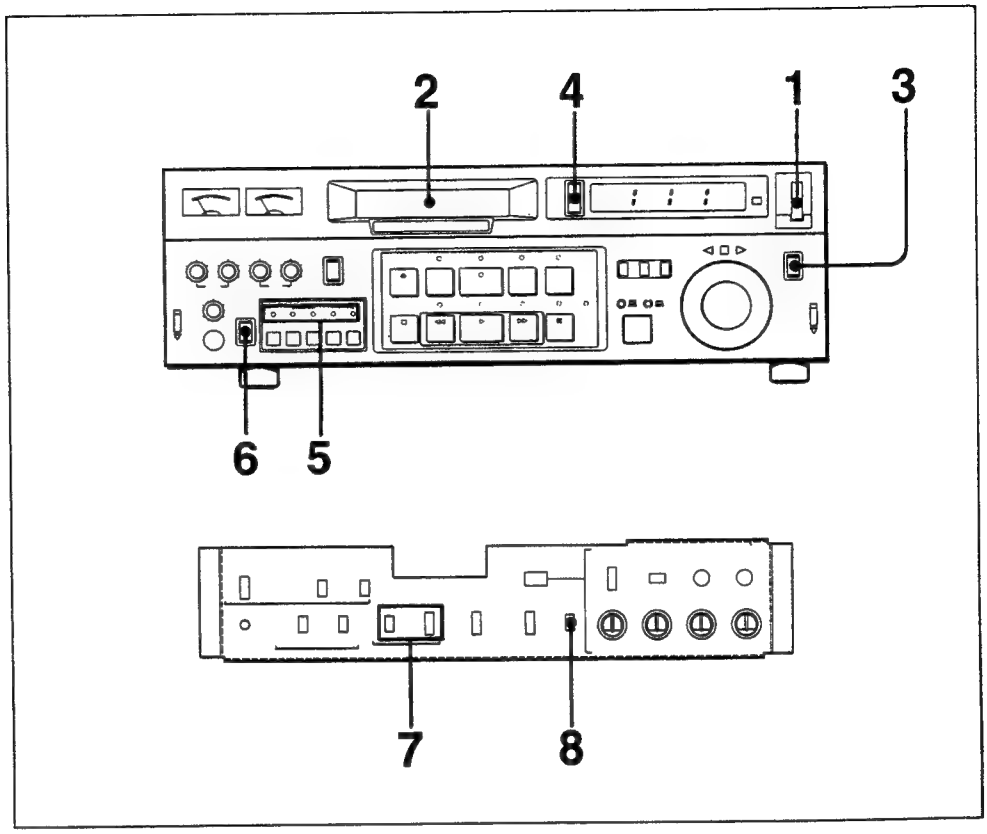
If recording pause mode continues for about 8 minutes, the tape around the head drum is automatically slackened to protect the video head and the tape. Hence, the still picture will disappear. This is called "long pause mode". To release the long pause mode, press the PAUSE button.

The time to enter tape protection mode can be set between 0.5 seconds and 8 minutes by using the dial menu 207. For details, see chapter 2.

1-6. PLAY BACK

Preparing for Playback

Prepare to play back as follows.



Preparing for playback

1 Set the POWER switch to ON.

2 Insert a cassette.

3 Set the REMOTE/LOCAL switch to LOCAL.

4 Set the time counter display switch to the time data you wish to display.

COUNTER: Displays the amount of tape travel in hours, minutes, seconds and frames.
Press the RESET button to reset the display to 0:00:00:00.

TC: Display the 8-mm time code or user bits.

The display of the 8-mm time code or user bits is determined by setting of the U-BIT/TIME switch of the sub-panel.
The same data as that displayed on the time counter can be superimposed on the monitor screen by setting with the basic menu function.

For details, see chapter 2 "System Setup from Menu".

5 Ensure that the following indicators are off.
- Indicator above the ASSEMBLE button
- Indicators above the INSERT buttons.

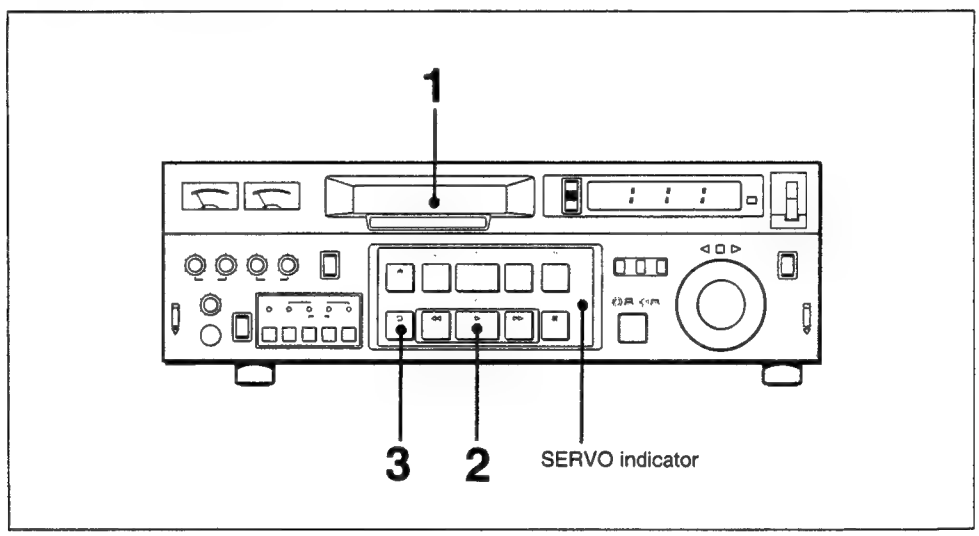
6 Set the MODE SELECT switch to NORMAL.

7 Set the MONITOR SELECT switch to the audio signal you wish to monitor.
For details, see "Selecting audio input signal to monitor" on page 1-33.

8 Set the VIDEO PRCS switch to NORM.

Normal Speed Playback

To play back video and audio signals at normal speed, proceed as follows.



Normal speed playback

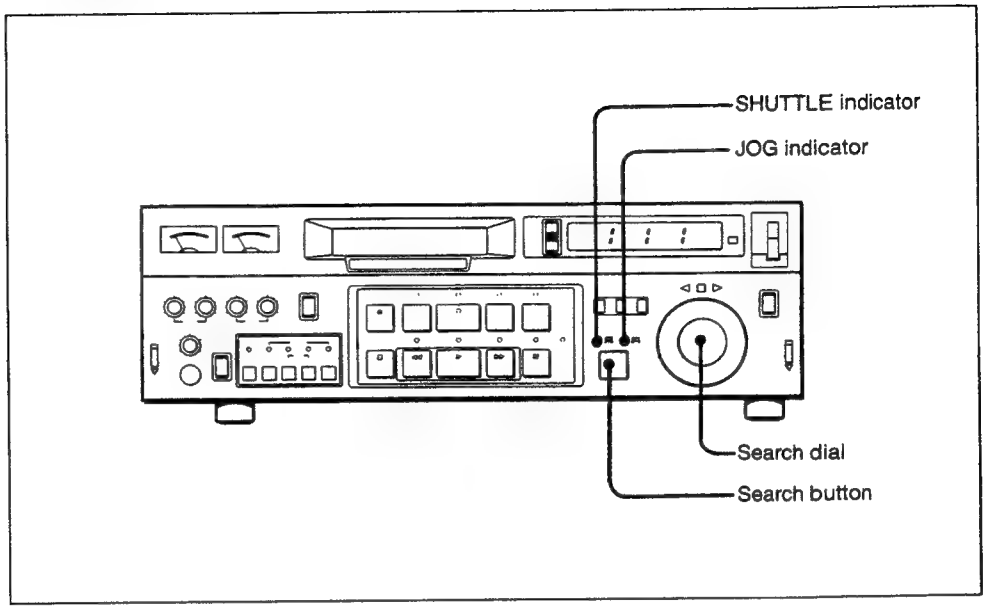
1 Insert a cassette.

2 Press the PLAY button.
Playback starts. The servo indicator lights when the head rotation and tape speed stabilize.

3 Press the STOP button to halt playback.
If played to its end, the tape is automatically rewound to the beginning and then stops.

JOG and SHUTTLE Mode Playback

JOG and SHUTTLE are variable speed playback modes. Rotate the search dial to set the speed.



Variable speed playback (JOG and SHUTTLE mode)

Press the dial to toggle between JOG and SHUTTLE modes. The current mode is indicated by the JOG and SHUTTLE indicators.

JOG mode (JOG indicator lit): Speed varies between 0 and ±1 times normal speed, corresponding to the rotation speed of the search dial. Use this mode to search for a desired point precisely.

SHUTTLE mode (SHUTTLE indicator lit): Speed varies between ±1/20 and 17 times normal speed, corresponding to the angle of rotation of the search dial. Use this mode to make a rough search for a desired position.

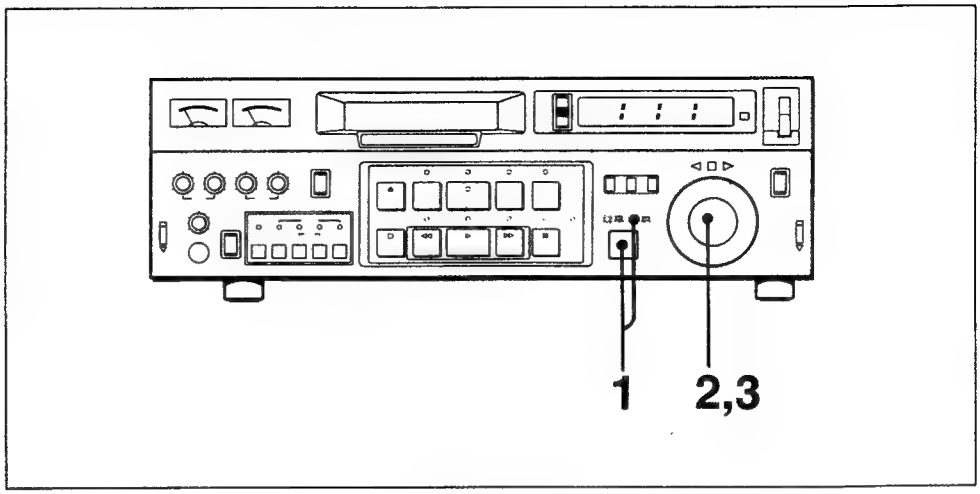
Tape protection mode

If the pause mode is held for about 8 minutes in search mode, the tape is advanced by several frames. If the pause mode continues to be held, this will occur every 8 minutes.

The time to enter tape protection mode can be set between 0.5 seconds and 8 minutes by using the dial menu 207. For details, see chapter 2.

JOG mode playback

To playback in JOG mode, follow the procedure below.



JOG mode playback

1 Press the search button to enter search mode.
The SHUTTLE or JOG indicator lights.
When the JOG indicator is not lit, press the search dial to light the JOG indicator.
The monitor shows a still picture and the still □ indicator lights.

2 Rotate the search dial at the desired speed.
Slow-motion playback starts, at a speed corresponding to the rotational speed of the search dial. The direction indicator (◁ or ▷) indicates the direction of playback.

3 To stop JOG mode playback, stop turning the search dial.
The tape stops and the □ lamp lights, and the monitor shows a still picture.

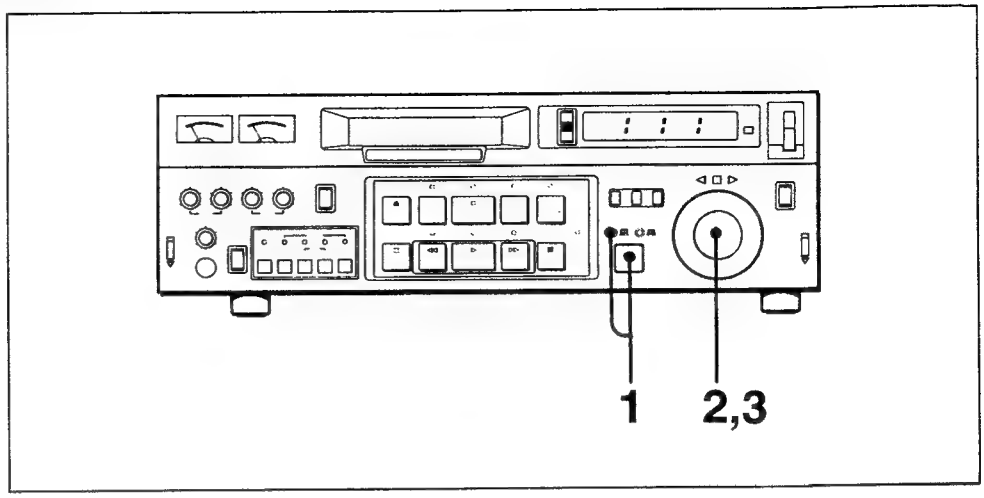
To terminate JOG mode playback

Press one of the PLAY, REW, F FWD or STOP button.

Audio monitoring in JOG mode playback

You can monitor the audio recorded on the PCM tracks during JOG playback.

SHUTTLE mode playback



SHUTTLE mode playback

1 Press the search button to enter search mode.
The SHUTTLE or JOG indicator lights.
When the SHUTTLE indicator is not lit, press the search dial to light the SHUTTLE indicator.
The monitor shows a still picture and the still □ indicator lights.

2 Turn the search dial to the angle for the desired speed.
The dial has a detent at the center position, corresponding to a speed of 0. Playback begins at the desired speed. The direction indicator (◁ or ▷) indicates the direction of playback.

3 To stop SHUTTLE mode playback, return the search dial to the center position.
The tape stops momentarily, the □ lamp lights, and the monitor shows a still picture.

To terminate SHUTTLE mode playback

Press one of the PLAY, REW, F FWD or STOP button.

Using the search button

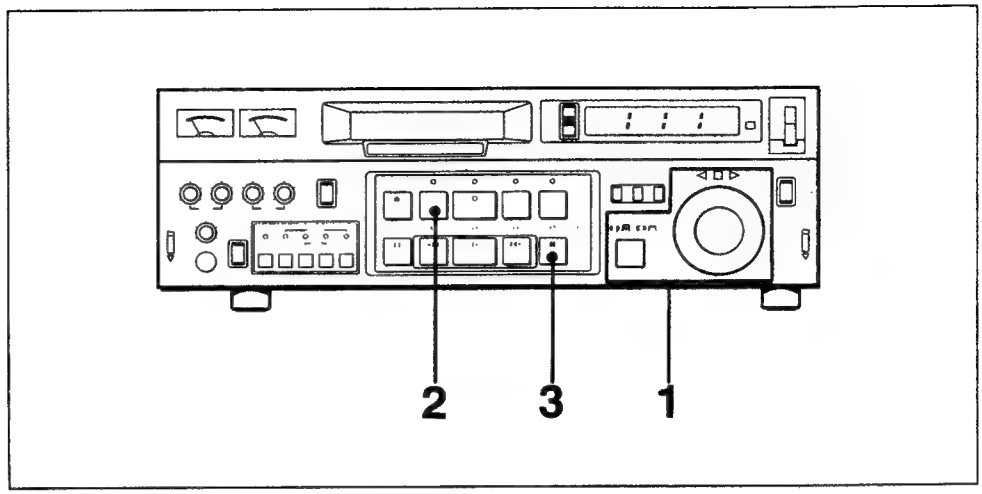
In SHUTTLE mode, you can use the search button as follows. Pressing the PLAY button alternately with the search button plays the tape at normal speed then at the speed selected with the search dial. Pressing the STOP button alternately with the search button alternately stops and starts playback at the selected speed.

Audio monitoring in SHUTTLE mode playback

You can monitor the audio recorded on the PCM tracks during SHUTTLE playback.

Starting playback at a desired time

To start playback at a desired time by using the PREROLL button, proceed as follows.



Playback using the PREROLL button

1 Search for the point from which to start the playback, then stop the tape.
Use the search dial to make a quick and exact search.
For details, see the explanation of "JOG and SHUTTLE Mode Playback" on page 4-12(E).

2 Press the PREROLL button.
The tape is rewound by five seconds, then stops in pause mode.

3 Press the PAUSE button exactly five seconds before you want to start playback.
The tape starts running. The tape transport will have stabilized at the desired time.

Obtaining stable video signals for the best possible playback picture

The unit has a built-in time base corrector to adjust for timing irregularities. Thus, the unit can supply stable video signals directly to all kinds of video equipment. You can adjust the phase and amplitude of the output signals by using the controls for TBC on the sub-panel, so that the unit can output a stable video signal synchronized with an external reference signal.
By connecting the BVR-55 TBC remote control unit (not supplied) to the TBC REMOTE connector on the rear panel, you can perform remote adjustment.
For information on the functions of the TBC controls, see the explanation on page 1-12.

1-7. EDITING

Videotape editing is the process in which selected scenes from a tape containing original material are arranged into sequences and combined with sound effects or background music to create the final program. In electronic editing, scenes from the playback and recorder VTRs are linked electronically, allowing the editor to adjust the entry and exit points until the result is satisfactory, executing the final recording automatically.
By connecting the EVO-9850 to an input source (video and audio source), you can perform manual editing using the PREROLL button. Also, you can perform automatic editing by using the unit with other VTRs and a Sony editing control unit such as the RM-450 or BVE-600. In addition, including the Sony DME-450 digital multi effects system in the system enables you to perform electronic editing with digital multi effects.

1-7-1. Selecting Editing Mode

Editing modes

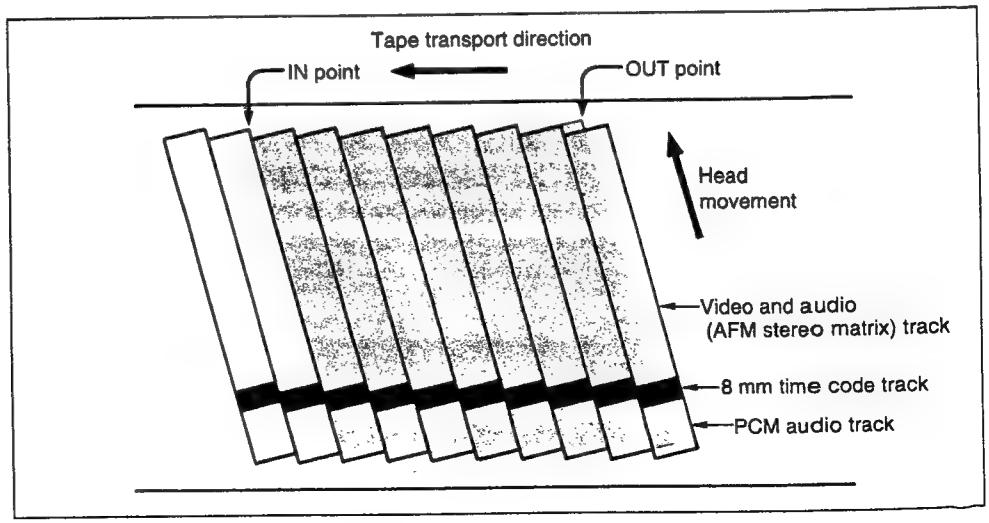
The unit gives you a choice of two editing modes: assemble mode and insert mode.

Assemble mode

New scenes are added to the end of existing recorded scenes. Video signal with the AFM audio signals, 2-channel PCM audio signals and 8-mm time codes are transferred at the same time.

Notes

- Use the assemble mode when using a new tape or if you wish to record onto a tape on which signals are not recorded continuously.
- In assemble mode, recording continues for a certain distance beyond the edit out point. This means that previously recorded information beyond the edit out point will be erased. Use the insert mode if you wish to insert material into a prerecorded tape.



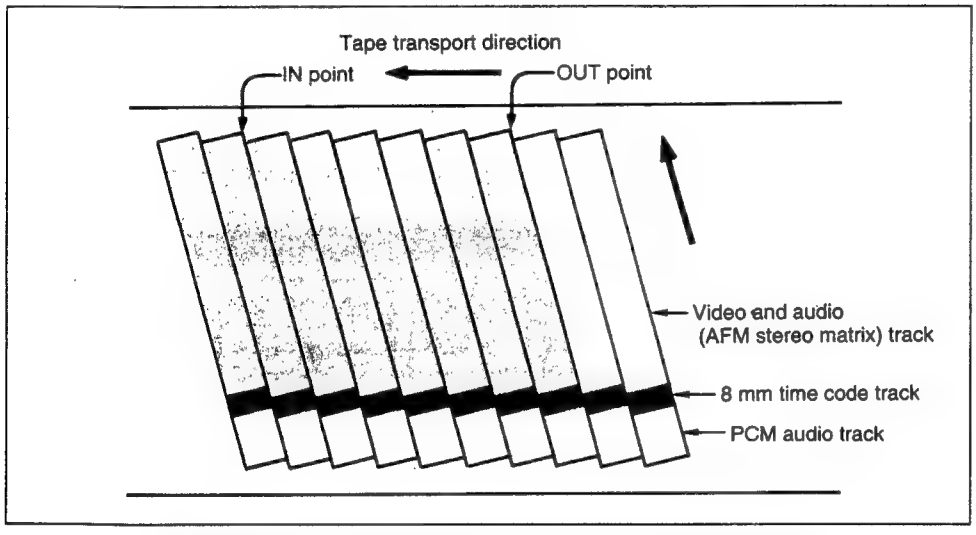
Tape pattern in assemble mode edit

Insert mode

A segment of new material is inserted into the tape at a predetermined point. Video signal with AFM audio signals, PCM audio signals and 8-mm time codes can be transferred separately or at the same time. Insert mode editing is a convenient way of replacing the video or audio contents of a certain segment of the tape, or to add narration or background music to previously recorded material.

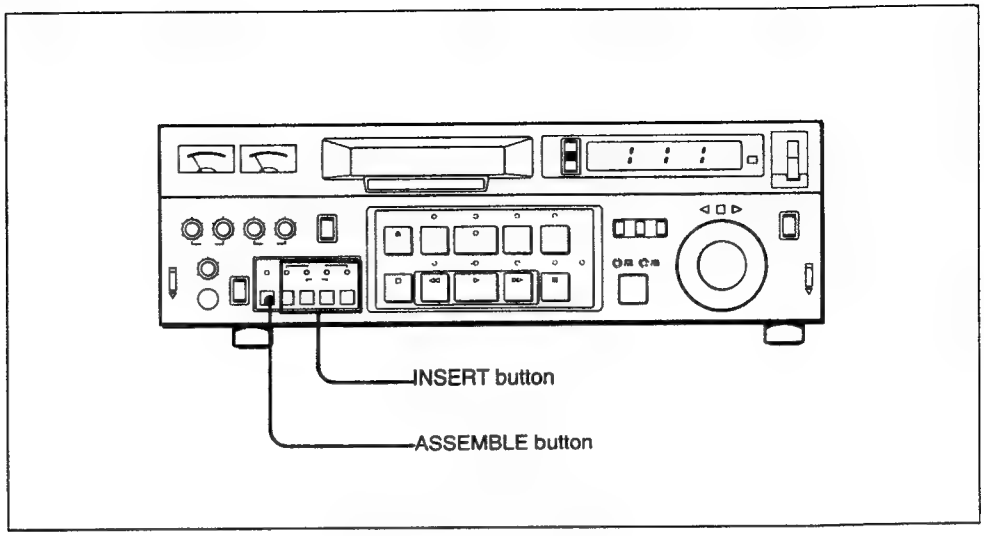
Notes

- AFM audio signals are recorded on the same track as the video signal. Thus, you cannot record the video signal and AFM audio signals separately.
- When recording the PCM audio signals or 8-mm time code in insert mode, the noise may appear on the played-back picture or AFM sound. This is not trouble. Video signals and AFM audio signals are maintained as they were.



Tape pattern when inserting the video signal with AFM audio signal only

Selecting edit mode



Controls for selecting edit mode

To edit in assemble mode

Press the ASSEMBLE button.

To edit in insert mode

Press one or more of the INSERT buttons—VIDEO, PCM CH-1, PCM CH-2 and TIME CODE—to select the input signals to be recorded.

1-7-2. Automatic Editing

You can perform automatic editing by setting up a system with other VTRs and a Sony editing control unit such as the RM-450 or BVE-600. In addition, by adding the Sony DME-450 digital multi effects system to the system, you can perform electronic editing combined with special effects. In this case, you must use two or more VTRs. The EVO-9850 is used as the recorder in the system. As the player VTRs, you can use another Hi8 VTR, Betacam SP VTR, or U-matic VTR.

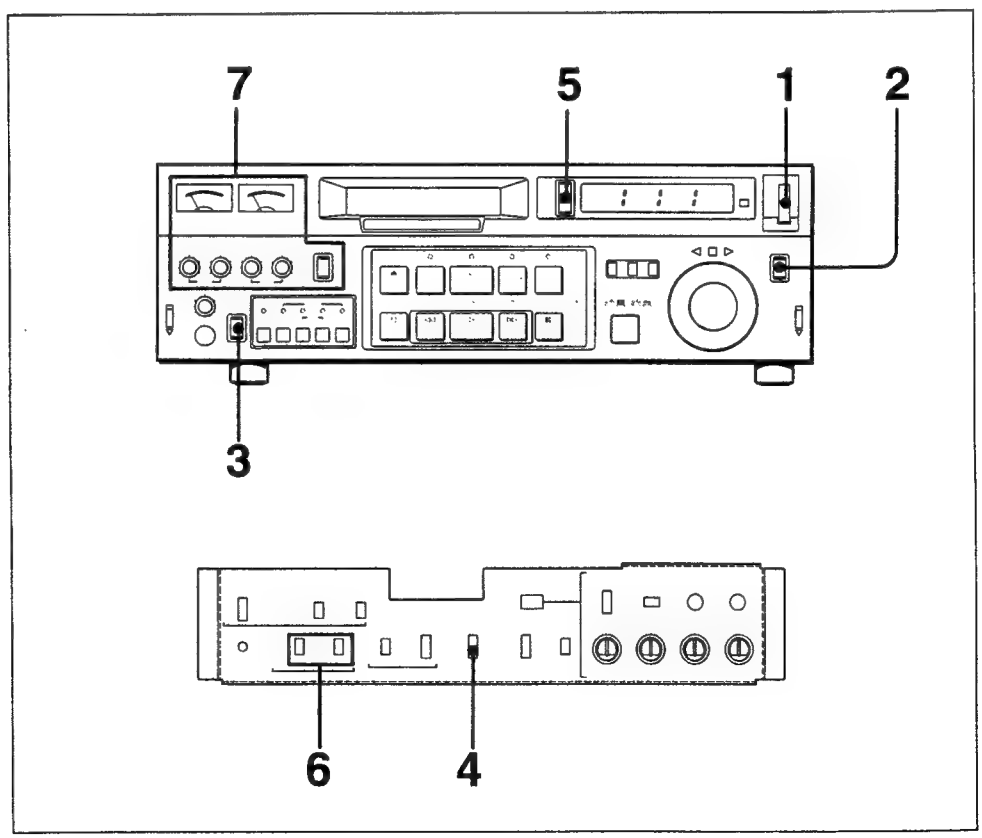
For details of system connection, see "Editing System Connections" on page 1-21.
For details of reference signal connection, see "Reference Signal Connections" on page 1-24.

Before Starting

During automatic editing with the RM-450 and two VTRs, the RM-450 remotely controls the two VTRs. On the EVO-9850, you can only turn the power on or off, select the input signal and adjust the audio signals. All editing operations are performed from editing control unit.

Switch settings and adjustment for a recorder

To use the unit as a recorder, make the following settings.



,Setting and adjustment to use the unit as a recorder

1 Set the POWER switch to ON.

2 Set the REMOTE/LOCAL switch to REMOTE.

3 Set the MODE SELECT switch to EDIT.

4 Select the input signal with the INPUT SELECT switch.

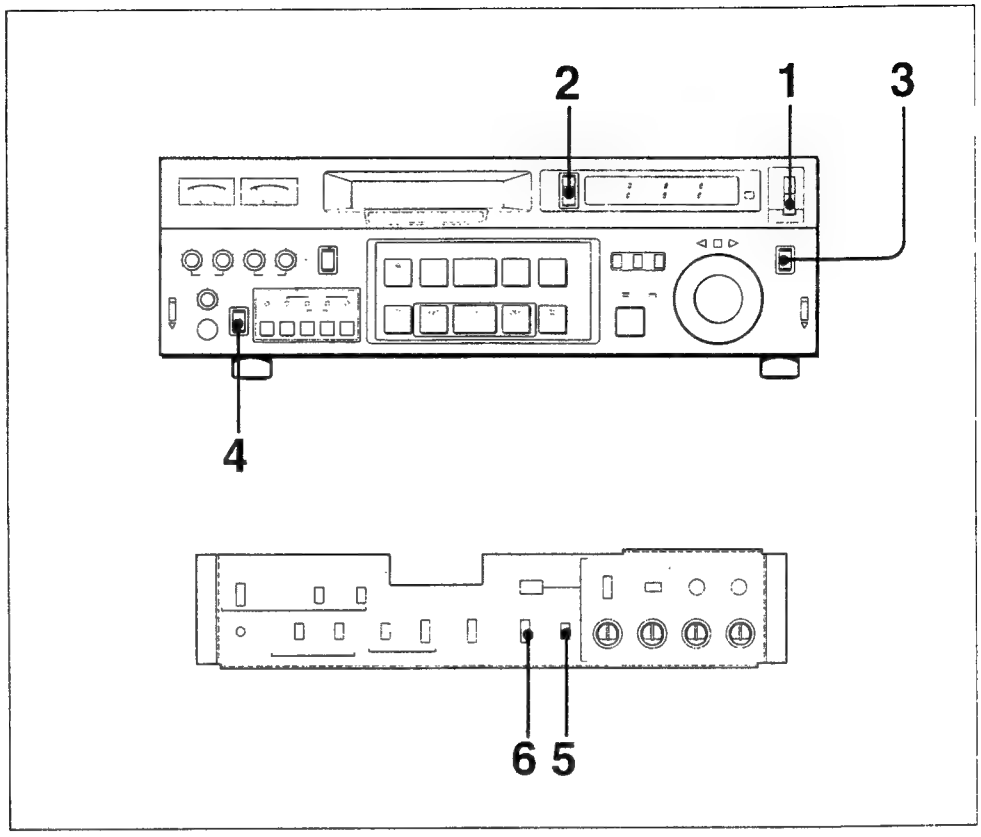
5 Set the time counter display switch to COUNTER or TC.

6 Select the audio track to record with the PCM/AFM INPUT SELECT switches.
For information on selecting the audio track, see "Selecting the audio recording system" on page 1-31.

7 While playing the tape back on the player, adjust the audio recording level with the AUDIO LEVEL controls.
For more information about setting this unit for use as a recorder, see page 1-30.

Switch settings for a player

To use the unit as a player, make the following settings.



Settings and adjustment to use the unit as a player

1 Set the POWER switch to ON.

2 Set the time counter display switch to COUNTER or TC.

3 Set the REMOTE/LOCAL switch to REMOTE.

4 Set the MODE SELECT switch to NORMAL.

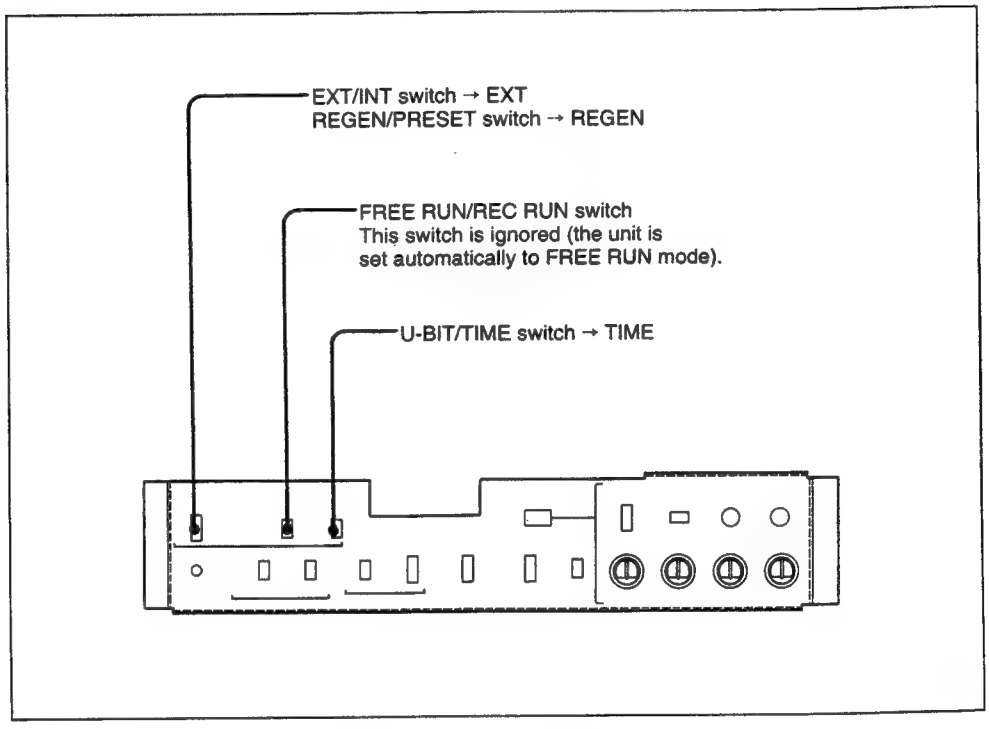
5 Set the VIDEO PRCS switch to EDIT.

6 Set the DUB OUT switch when editing with the DUB OUT connector.
8 mm: Set the switch to this position when connecting another Hi8 VTR.
U-CONV: Set the switch to this position when connecting a U-matic VTR (not SP system) or when using a conventional U-matic tape in an SP system U-matic VTR.
SP: Set the switch to this position when connecting an SP system U-matic VTR and inserting an SP tape.

For more information about setting this unit for use as a player, see page 1-37.

Switch setting when using external time code

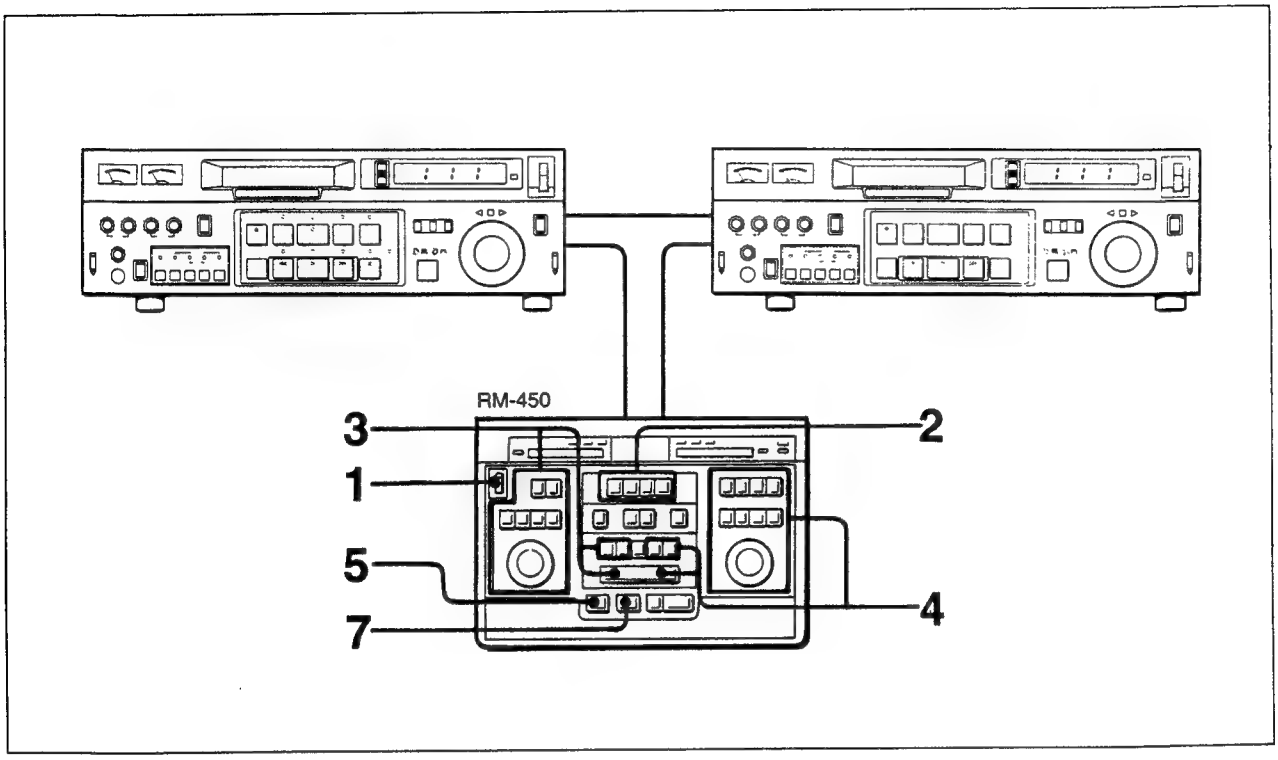
By installing the EVBK-100 SMPTE time code interface kit, the built-in 8-mm time code generator can be synchronized with the signal of an external time code generator input to the TIME CODE IN connector. Also, the 8-mm time code played back from the tape is converted to SMPTE time code and output from the TIME CODE OUT connector. In such a case, you must set the switches as follows.



TIME CODE switches settings

Operations for Automatic Editing

To perform automatic editing by using the RM-450 Sony editing control unit, proceed as follows.



Automatic editing using the RM-450.

1 Turn on the power of the RM-450.

2 Set the edit mode.

3 Set the IN and OUT points on the player.

4 Set the IN point on the recorder.

5 Press the PREVIEW button to rehearse the edit.
To modify an edit point, use the TRIM button on the RM-450.

6 Repeat steps 3 through 5 until you have set all necessary edit points.

7 Press the AUTO EDIT button to execute the edit.

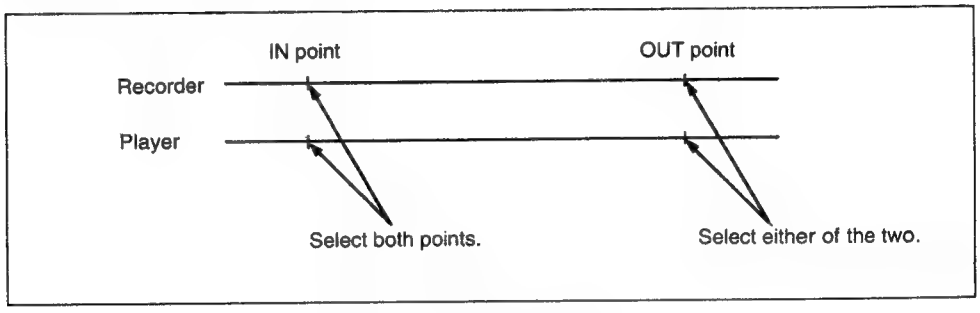
For details of how to operate the RM-450, refer to the instruction manual provided with the unit.

Confirming an executed edit

After editing, press the REVIEW button. The part just edited is played back for confirmation. Then, the tape stops at the edit out point.

Edit points

For four edit points (IN and OUT points on the recorder and player), two IN points and either of the OUT points should be set by the operator. The remaining OUT point is set automatically.



Automatic setting of edit points

Automatic editing with the BVE-600 or BVE-910

You can use this unit as a recorder for A/B roll editing by making up a system with the BVE-600 or BVE-910. Also, you can add the DME-450 digital multi effect system to perform electronic editing with multi effects. For details, read the instruction manuals furnished with these units.

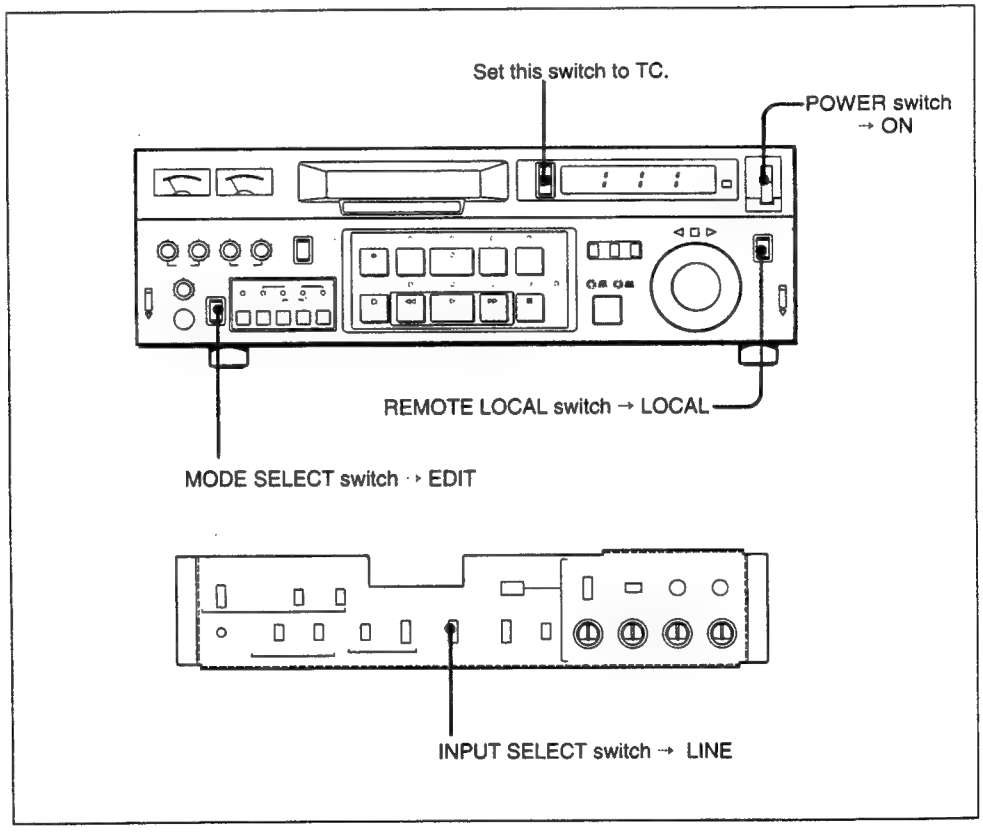
For system connections and reference signal connections, see "Editing System Connections" on page 1-21 and "Reference Signal Connections" on page 1-24.

1-7-3. Manual Editing
— Editing with the PREROLL button

Editing where you set the edit in point and edit out point manually, without deciding these points beforehand, is called manual editing.
By using the PREROLL button, you can easily record with the unit while editing the signal from a video camera or another VTR.
For details of connections, see "Editing System Connections" on page 1-21.

Before Starting

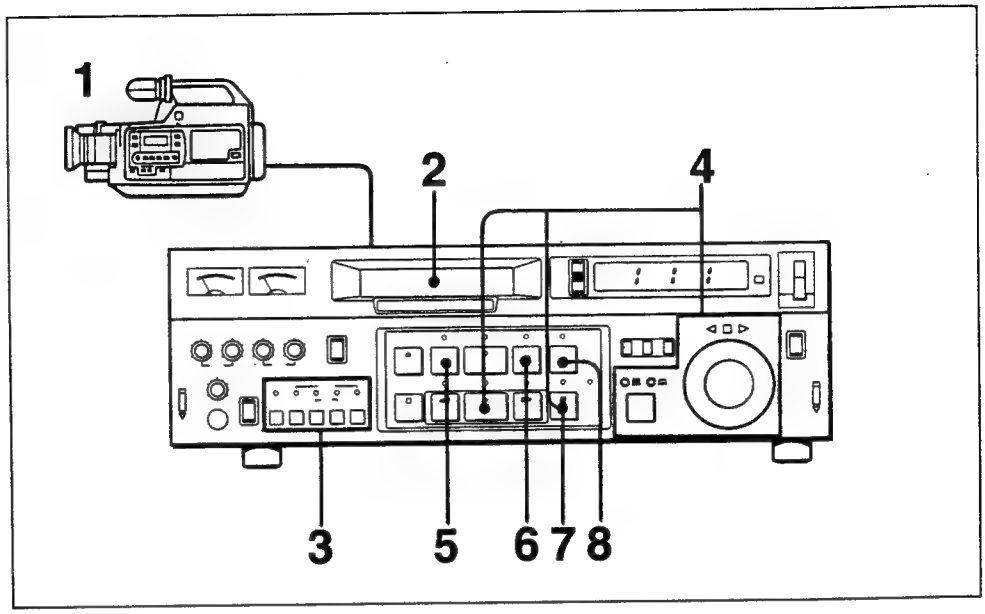
To perform manual editing, set the switches as follows.



Switch settings for editing camera signals

Operation for Manual Editing

To edit signals from a video camera, proceed as follows.



Editing the camera signal

1 Turn on the power of the camera. Adjust the camera as necessary.

2 Insert a cassette.

3 Set edit mode.

4 Play back the tape. Press the PAUSE button at the point where you want to start recording the camera signal (this point is the edit in point).
You can quickly search for a desired point with the search dial.
For information about how to use the search dial, see "JOG and SHUTTLE Mode Playback" on page 1-39.

5 Press the PREROLL button.
The tape is rewound to a point five seconds prior to the edit in point.

6 Press the EDIT button.

7 Press the PAUSE button.
The tape is played back for five seconds, and the signal from the camera starts to be recorded from the edit in point.

8 Press the CUT OUT button to terminate editing.
The unit stops editing and plays back the pictures in normal playback mode.

To stop the tape running, press the STOP button.

Notes

- When recording playback pictures from a VTR, start playback five seconds or more before the edit in point to allow the tape transport to stabilize.
- If you start editing directly from stop mode or interrupt editing by pressing the STOP button, the picture will be distorted at that point.

Prerolling the tape for editing

The PREROLL button is used to rewind the tape a certain distance from the edit in point, to allow the time for the tape synchronized with another tape.

Note on changing the preroll time

The preroll time for this unit is factory preset to 5 seconds, but can be set to any integral number of seconds between 0 and 15. If you do change the preroll time, however, set it so that the amount of recorded material prior to the first in point is longer than the preroll time.

For more information about preroll time, see the explanation of enhanced menu item 214 on chapter 2.

Note

When you start recording from pause mode without using the PREROLL button, the noise may appear at record starting point of the video, audio and time code signals. Use the PREROLL button when starting recording from pause mode.

1-8. HEAD CLEANING and MOISTURE CONDENSATION

Head Cleaning

If the picture temporarily disappears or if snow or noise appear on the picture, the video head is probably dirty and should be cleaned.
Clean the video heads with the supplied V8-25CLH cleaning cassette. Read the cleaning cassette instructions carefully, as improper use can damage the heads.

Cleaning

1 Insert the cleaning cassette.

2 Press the PLAY button.

3 Let the cleaning cassette run for about 15 seconds, then press the STOP button.

4 Press the EJECT button to eject the cleaning cassette.

Notes

- Do not run a cleaning cassette for more than 15 seconds at a time, nor use it unless the picture quality clearly indicates the need for head cleaning. Excessive use of a cleaning cassette will shorten the life of the heads.
- Do not rewind the cleaning cassette every time it is used. Use the tape to its end. However, do not use that cleaning cassette again. Use the new cleaning cassette.

Video head replacement

If the picture quality is still unsatisfactory after cleaning, the video heads may need to be replaced. The heads have a life of approximately 500 to 1000 hours. With this unit, the total operating time of the heads can be checked with dial menu 205 HOUR METER (DRUM).

Moisture Condensation

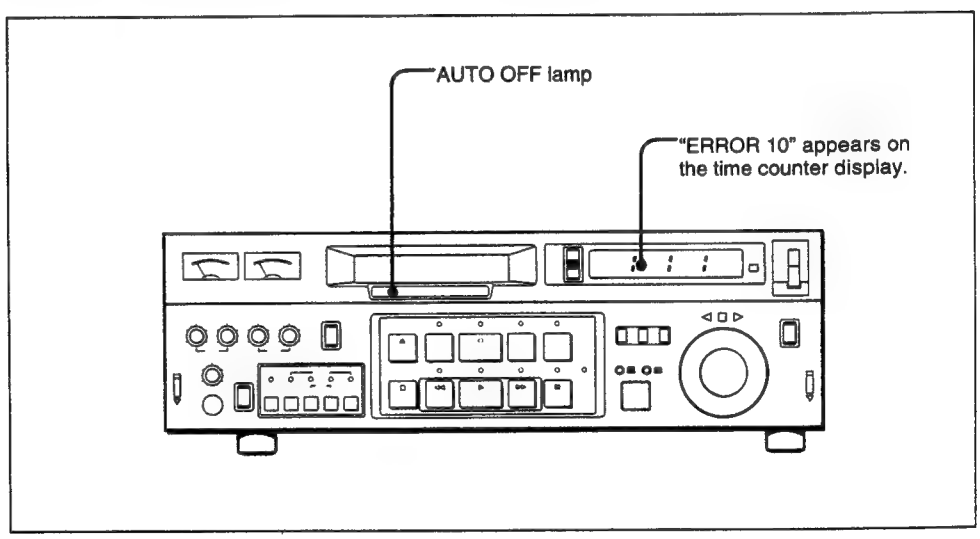
Moisture can condense on the head drum and tape guides when the unit is moved from a cold to a warm location, when the heating turned on in a cold room, or when the unit is placed in a very warm room.
Videotapes played with the unit in this state may adhere to the moistened surfaces. To prevent this, the unit features a condensation detector.

Note

The condensation detector requires about 10 minutes to detect moisture on the drum and tape guides. When using the unit under conditions like those described above, wait about 10 minutes before attempting to turn on the power.

When moisture is detected

If moisture is detected on the head drum during operation, the AUTO OFF indicator on the front panel lights, and the "ERROR-10" message is displayed in the time counter display.



Indications when moisture is detected

As soon as moisture is detected, the drum and capstan motors halt, the cassette is ejected, and the drum begins rotating again. In this state, all unit functions are disabled.
Once the moisture has evaporated, the AUTO OFF indicator goes off and the error message disappears.

If the AUTO OFF indicator lights or the "ERROR-10" message is displayed when power is turned on

Leave the power on, and wait for the indicator to go off and the message to disappear. Cassettes cannot be inserted while the indicator is lit.

If the AUTO OFF indicator does not light and no error message is displayed when the power is turned on

It is safe to begin using the unit.

Note on editing in standard 8mm mode

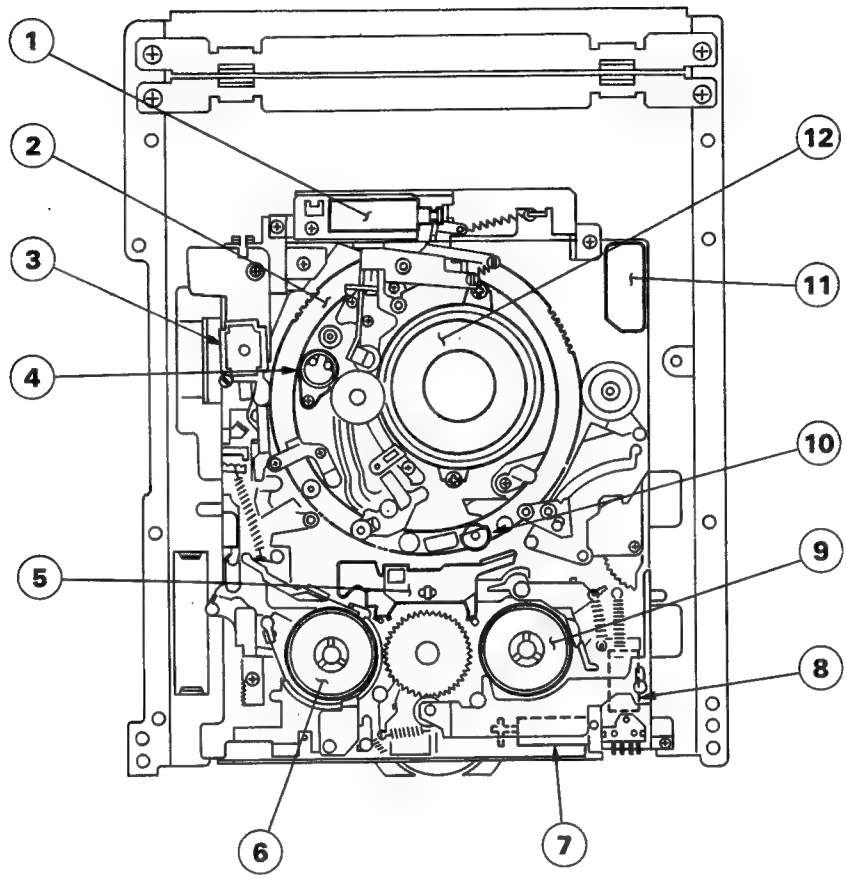
Do not do video insert editing and audio insert editing at the same time. Please perform audio and video insert edits separately when insert edits are required in standard 8mm mode.

SECTION 2
SERVICE INFORMATION

2-1. LOCATION OF MAIN PARTS

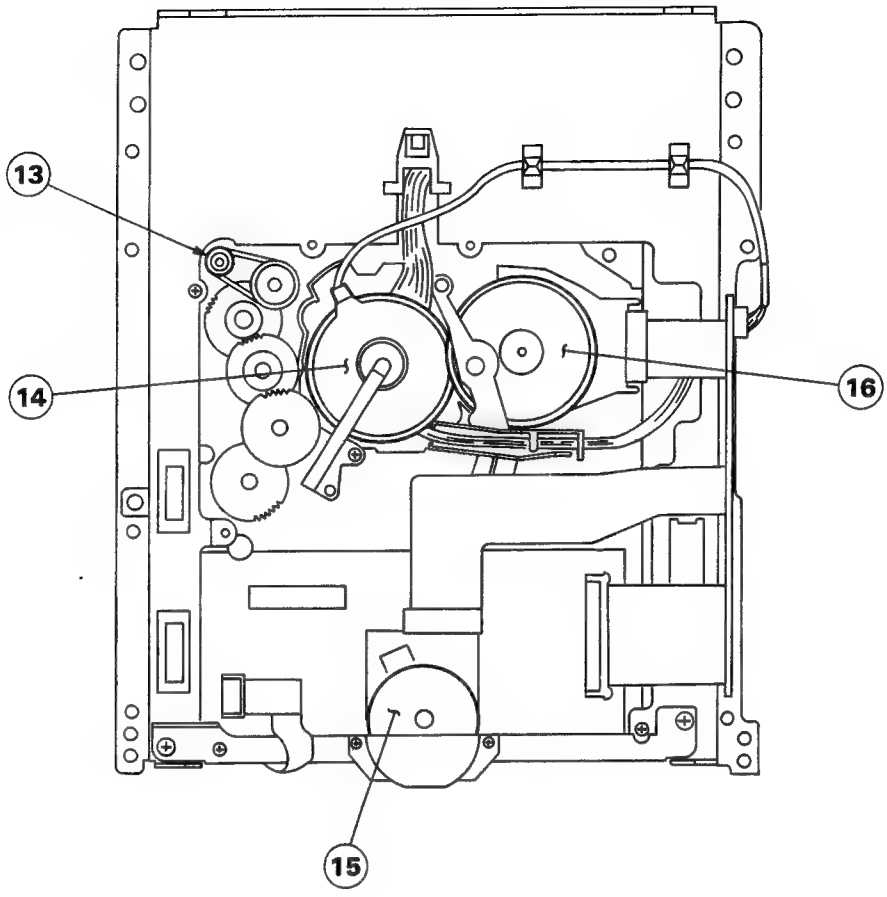
2-1-1. Location of Main Mechanical Parts/Components

〈TOP VIEW〉



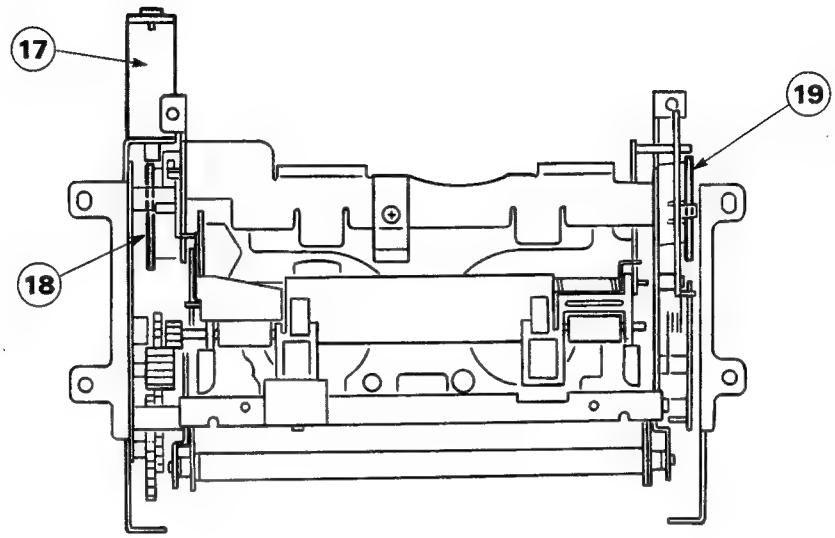
① Cleaning Roller Assembly
② Threading Ring
③ S Tension regulator Sensor Assembly
④ Capstan
⑤ Tape Top/End LED
⑥ Supply Reel Table
⑦ Brake Plunger Solenoid
⑧ Control Motor
⑨ Take-up Reel Table
⑩ Pinch Roller Arm Assembly
⑪ Threding Motor
⑫ Drum

〈BOTTOM VIEW〉



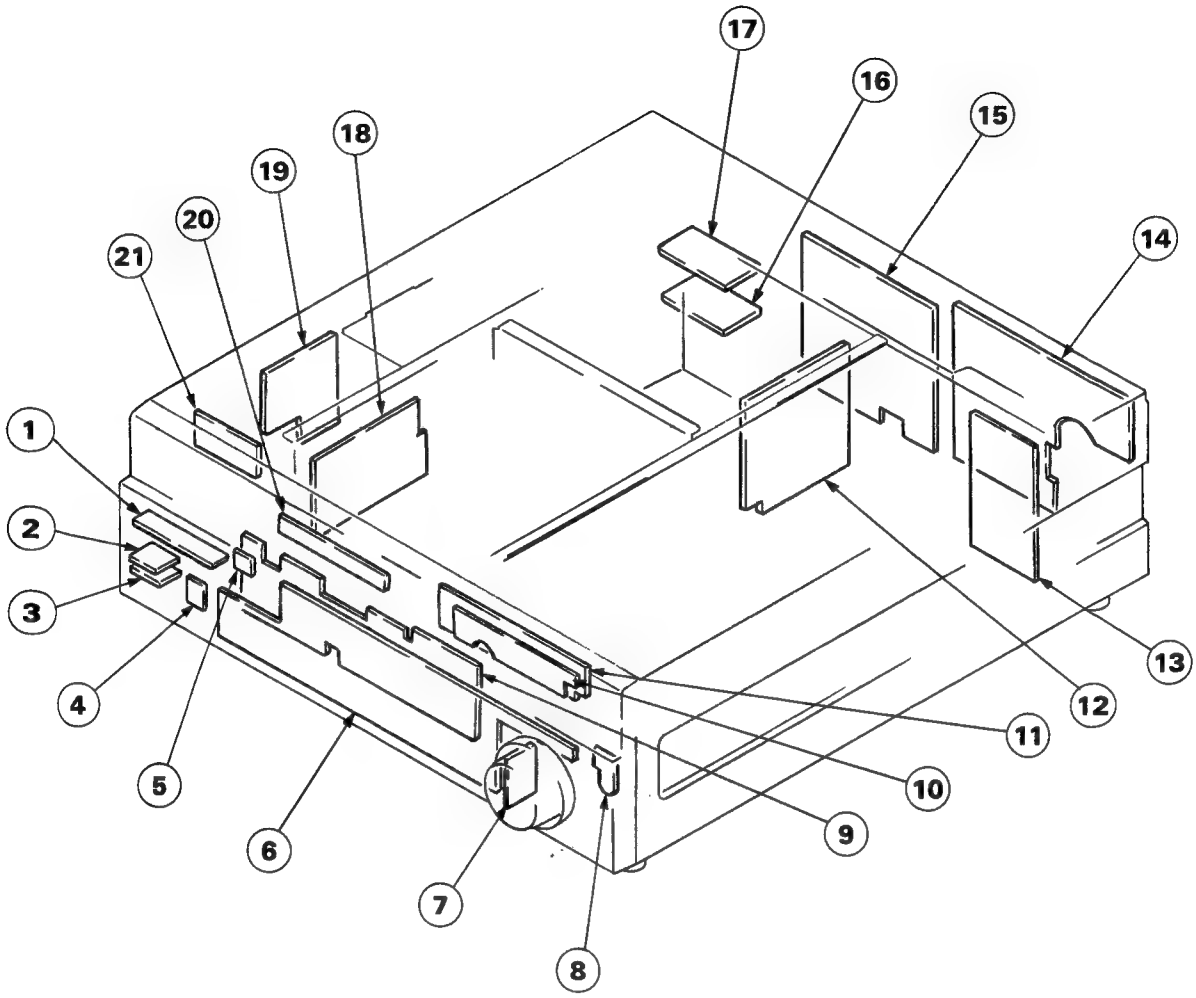
⑬ Threading Motor
⑭ Drum
⑮ Reel Motor
⑯ Capstan Motor

Cassette Compartment
〈TOP VIEW〉

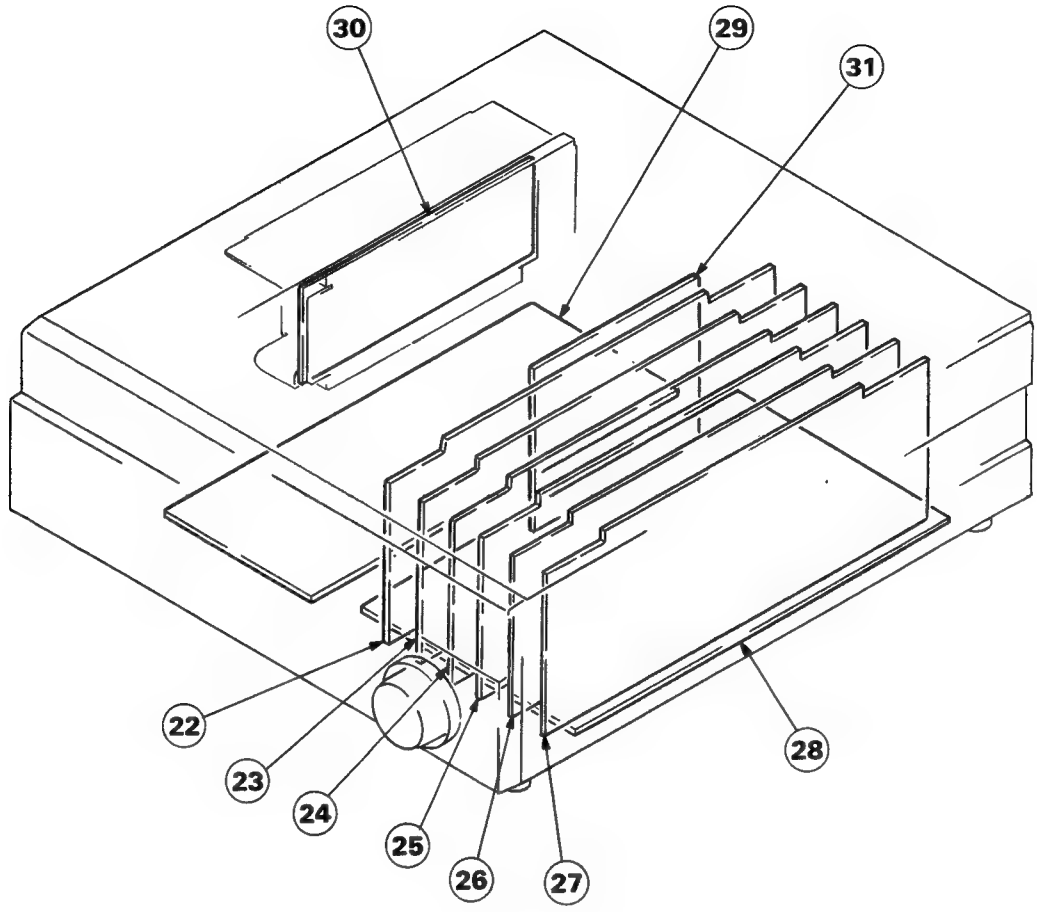


⑰ Cassette Loading Motor ⑲ Tape Top Sensor
⑱ Tape End Sensor

2-1-2. Location of Printed Circuit Boards

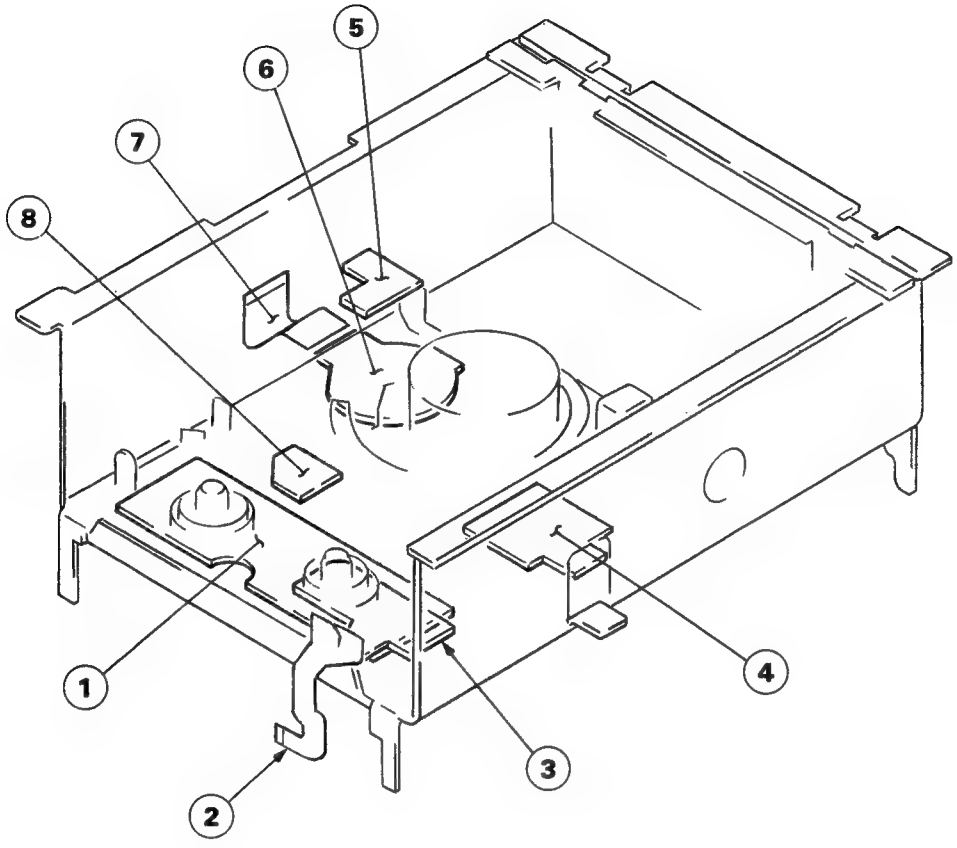


① VR-122 Board
② VR-130 Board
③ HP-52 Board
④ SW-540 Board
⑤ SW-466 Board
⑥ KY-217 Board
⑦ PTC-32 Board
⑧ SW-543 Board
⑨ SW-467 Board
⑩ DP-101 Board
⑪ DD-12 Board
⑫ AA-57 Board
⑬ AC-121 Board
⑭ CP-176 Board
⑮ CP-177 Board
⑯ RM-122 Board
⑰ CP-176 Board
⑱ CN-551 Board
⑲ DC-57 Board
⑳ LP-52 Board
㉑ MT-57 Board

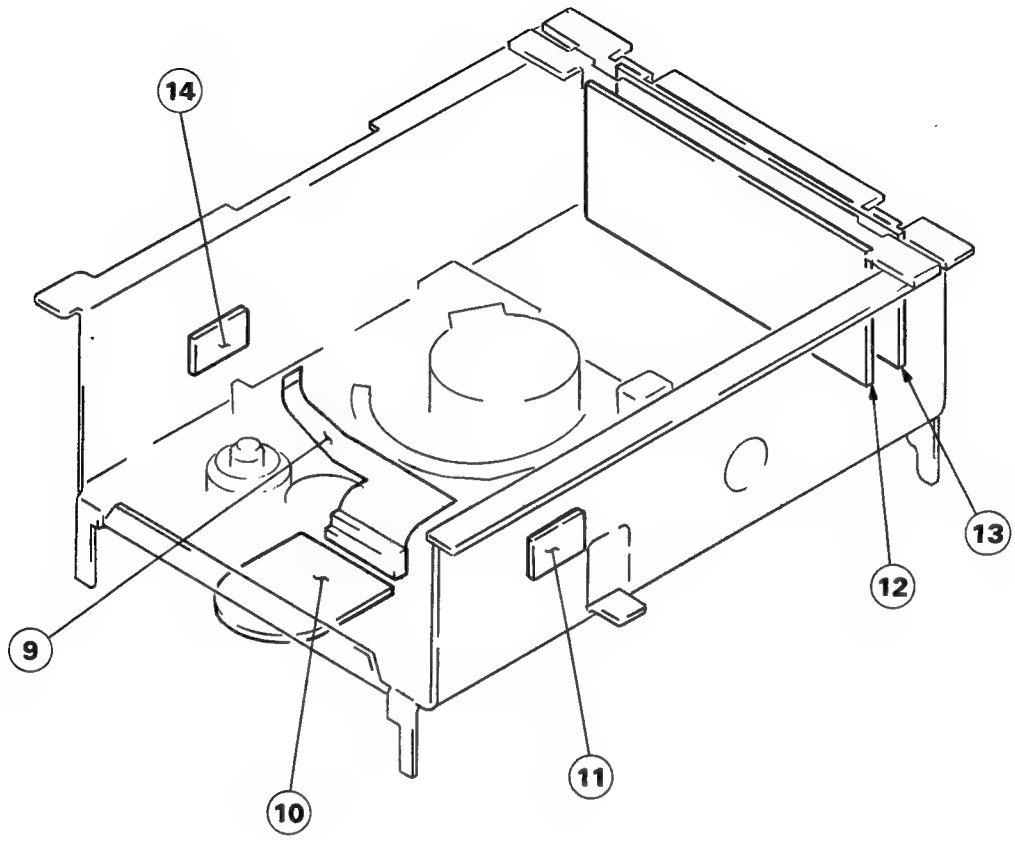


㉒ AU-157 Board
㉓ AU-156 Board
㉔ MD-81 Board
㉕ DM-87 Board
㉖ VA-111 Board
㉗ TBC-21 Board
㉘ MB-356 Board
㉙ SST-2 Board
㉚ SOPS-1030 Board
㉛ PD-62 Board

MECHANICAL BLOCK



① RS-31 Board	⑤ TR-72 Board
② FP-206 Flexible Board	⑥ Capstan Motor Board
③ MS-36 Board	⑦ FP-84 Flexible Board
④ LM-22 Board	⑧ LD-1 Board



⑨ FP-122 Board
⑩ Reel Motor Board
⑪ TS-74 (R) Board
⑫ PRE-10 Board
⑬ VRA-4 Board
⑭ TS-74 (L) Board

2-2. PRINTED CIRCUIT BOARDS

The circuit information is provided below.

SYSTEM	BOARD	CIRCUIT FUNCTION
VIDEO	MD-81	Y/C REC Video Process
	VRA-4	REC AMP/Flying Erase OSC
	PRE-10	PB Head AMP (VIDEO, AFM, PCM, ATF), RE, EQ
	DM-87	Y/C PB Video Process
	CR-40	DG Compensator (LINE)
	CR-41	DG Compensator (DUB)
	FL-129	PB Chroma LPF
	FL-130	PB Y LPF (Hi8)
	FL-131	PB Y EQ (NORMAL)
	TBC-21	TBC/GEN Lock
	VA-111	Video Interface/Sync, Burst Insert
	CP-176	Video Input/Output Interface
AUDIO	AU-156	AFM Audio, Input/Output Select
	VR-122	Audio Level Control
	AU-157	PCM Audio, Input/Output Select
	AA-57	Audio Input/Output AMP
	CP-177	Audio Input/Output Interface
SYSTEM CONTROL SERVO	SST-2	Servo/System Control
	CN-511	Servo Interface
	KY-217	Function Key Board
	DD-12	Display Drive
	PTC-32	Search Dial
	LP-52	Mode Display
	DP-101	Display
	RM-101	15Pin Connector (for TBC Remote controller)
	RM-122	9Pin Connector
	SW-467	Sub Panel Switch
	SW-540	Mode Select Switch
	SW-543	Remote Panel Switch
	TS-74	Tape Top/End Sensor
	RS-31	Mechanical Control
	MS-36	Mode Swith
	LM-22	Loading Sensor
	LD-1	Tape Sensor
	TR-72	S-Tension Regulator Sensor

SYSTEM	BOARD	CIRCUIT FUNCTION
POWER	AC-121	AC Input
	DC-57	DC Supply
OTHERS	MB-356	Mother Board
	MT-57A	Audio Level Meter
	SW-466	Audio Meter Select Switch
	VR-130	Headphones Level
	HP-52	Headphones Jack
	FP-84	Connection
	FP-122	Connection
	FP-206	Connection

2-3. CONNECTORS

When external cables are connected to the various connectors of the connector panel during maintenance, the hardware listed below or equivalents must be used.

PANEL INDUCTION	CONNECTOR
VIDEO IN VIDEO OUT REF VIDEO IN MONITOR VIDEO	1-560-069-11 PLUG, BNC, MALE
MONITOR AUDIO	1-506-311-00 PLUG, PIN
DUB IN	1-561-055-00 PLUG, 7P, FEMALE
TBC REMOTE (15P)	1-561-610-21 1-561-929-00 FEMALE and JUNCTION SHELL, 15P
DUB OUT	1-508-948-00 PLUG, 7P, MALE
REMOTE (9P)	1-560-651-00 PLUG, 9P, MALE and 1-561-749-00 JUNCTION SHELL, 9P
AUDIO LINE IN	1-508-084-00 CONNECTOR, XLR 3P, MALE
AUDIO LINE OUT	1-508-083-00 CONNECTOR, XLR, 3P, FEMALE
MONITOR TV	1-506-161-00 CONNECTOR, 8P, MALE
S-VIDEO IN S-VIDEO OUT	S-VIDEO CONNECTOR CONNECTING CABLE (Option) : YC-30V (3m) YC-15V (1.5m)

2-4. CONNECTOR INPUT/OUTPUT SIGNAL

The connector INPUT/OUTPUT signals of the connector panel are as follows.

INPUT

VIDEO IN : 1.0±0.3 V p-p, 75 ohms, unbalanced, sync negative
DUB IN (8mm) :
Luminance signal : 0.5±0.2 V p-p, 75 ohms, sync negative
Chroma signal : 0.5±0.1 V p-p, 75 ohms
REF VIDEO IN : 1.0±0.3 V p-p, 75 ohms, unbalanced, sync negative

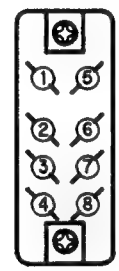
MIC IN : −60 dBu, 3 kohms 以上, balanced
CH-1/L, CH-2/R
AUDIO LINE IN : +4 dBu, 600 ohms, balanced
CH-1/L, CH-2/R
CH-3/L, CH-4/R
S-VIDEO IN :
Luminance signal : 1.0±0.3 V p-p, 75 ohms, unbalanced, sync negative
Chroma signal : 0.268±0.07 V p-p (at burst level), 75 ohms, unbalanced

OUTPUT

VIDEO OUT : 1.0±0.2 V p-p, 75 ohms, unbalanced, sync negative
MONITOR VIDEO OUT : 1.0±0.2 V p-p, 75 ohms, unbalanced, sync negative
TV-VIDEO OUT (8p)
DUB OUT (8mm) :
Luminance signal : 0.5±0.2 V p-p, 75 ohms, sync negative
Chroma signal : 0.5±0.1 V p-p, 75 ohms load
(U-matic) : Luminance : 1.7±0.3 V p-p,
signal 1 kohms, sync negative
Chroma signal : 0.9±0.2 V p-p, 1 kohms

AUDIO LINE OUT : +4 dBu, 600 ohms, balanced
PCM
CH-1/L, CH-2/R
AFM
CH-3/L, CH-4/R
MONITOR AUDIO OUT : −5 dBu (at 47 kohms load), unbalanced
TV-AUDIO OUT (8P)
HEADPHONES OUT (FRONT PANEL) : −46〜−26 dBu (at 8 ohms load), Stereo
S-VIDEO OUT :
Luminance signal : 1.0±0.12 V p-p, 75 ohms, unbalanced, sync negative
Chroma signal : 0.286±0.05 V p-p(at burst level), 75 ohms, unbalanced

MONITOR
8P



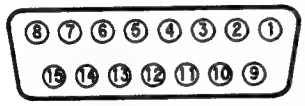
Pin	OUTPUT signal
1	AUDIO MONITOR OUT (X)
2	VIDEO OUT (X)
3	NC
4	NC
5	AUDIO MONITOR OUT (G)
6	VIDEO OUT (G)
7	NC
8	NC

REMOTE CONTROL

REMOTE 1 (9P)

Pin	I/O signal	I/O
1	FRAME GND	–
2	TRANSMIT A	O
3	RECEIVE B	I
4	RECEIVE COMMON	–
5	SPARE	–
6	TRANSMIT COMMON	–
7	TRANSMIT B	O
8	RECEIVE A	I
9	FRAME GND	–

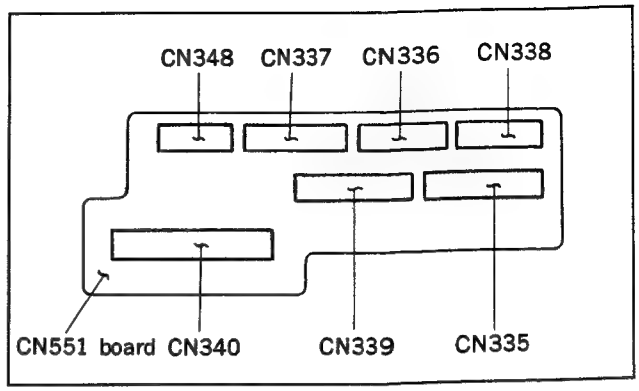
TBC REMOTE



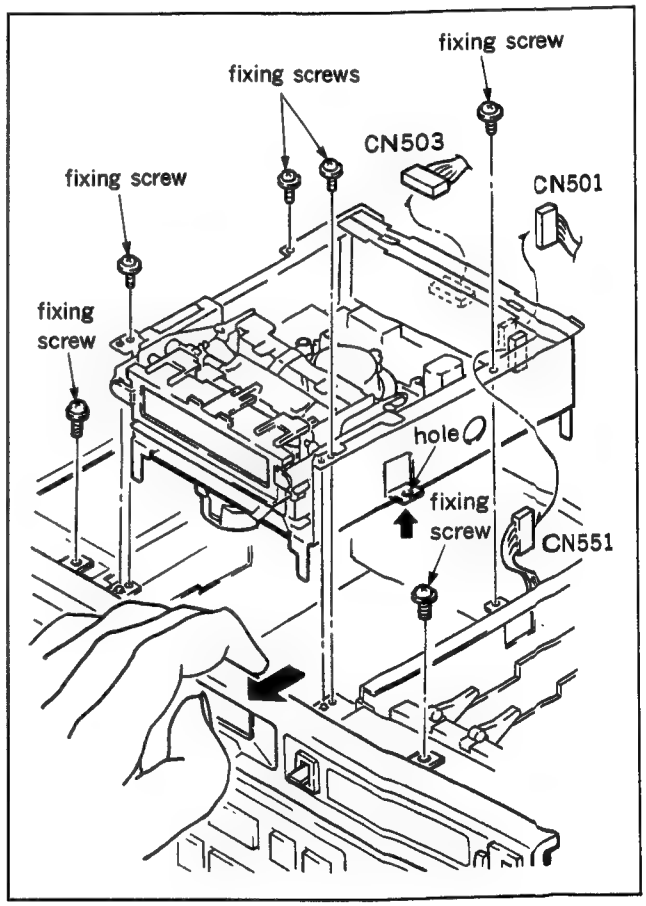
Pin	I/O signal	I/O
1	SYNC CONTROL	I
2	HUE CONTROL	I
3	SC CONTROL	I
4	VIDEO LEVEL CONTROL	I
5	SETUP CONTROL	I
6	CHROMA LEVEL CONTROL	I
7	−9 V	O
8	GND	I/O
9	FRAME GND	I/O
10	FREEZE	O
11	NOISE REDUCTION	O
12	NC	–
13	NC	–
14	NC	–
15	+9 V	O

2-6. REMOVAL OF THE MECHANICAL DECK BLOCK

1. Remove the top panel according to section 2-5. and remove the two screws on the upper of the front panel.
2. Disconnect the following nine connectors.
   CN335, CN336, CN337, CN338, CN339, CN340 and CN348/CN-551 board
   CN503/VRA-4 board
   CN511/PRE-10 board



3. Remove the four screws, and remove the front panel while pulling it upward and pushing slightly forward.
   Take care not to pull up the mechanical deck block too much because the VRA-4 board connector, CN501, remains connected.
4. Disconnect connector CN501 from the VRA-4 board.



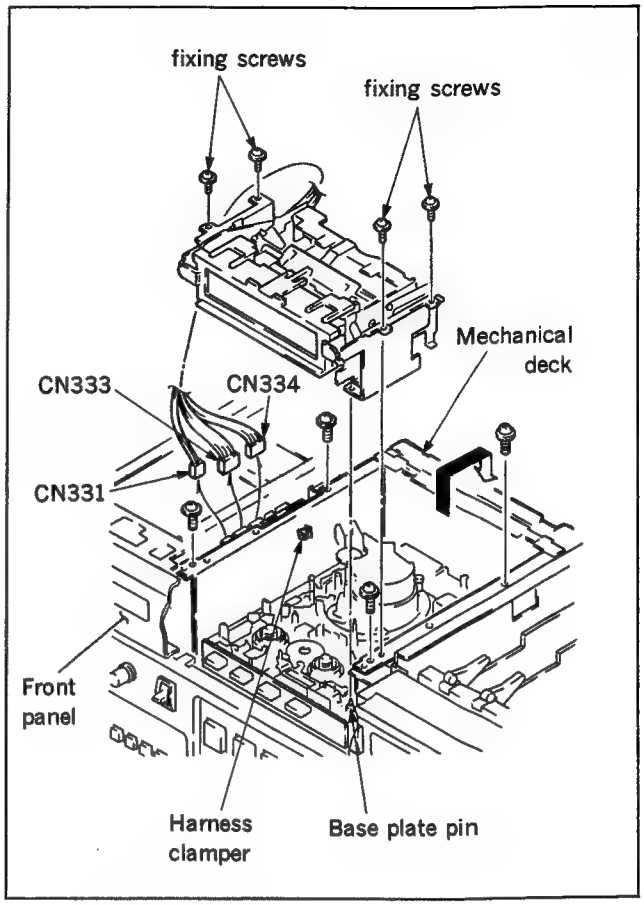
〈Note for installation〉
Align the holes of the mechanical deck indicated by the arrows with the pins on the base plate.

2-7. REMOVAL OF THE CASSETTE COMPARTMENT ASS'Y

1. Remove the top panel according to section 2-5.
2. Remove the four screw at the mechanical deck block.
3. Pull out the harness as shown in the figure, unhook it from the harness clamper, then disconnect connectors CN331, CN333 and CN334 from the CN551 board.
4. Remove the mechanical deck while pulling it slightly upward, and take it down after shifting cassette compartment ass'y and the front panel slightly backward so that they are not overlapped.
5. Remove the four screws on the cassette compartment ass'y, and remove it while pulling it upward.

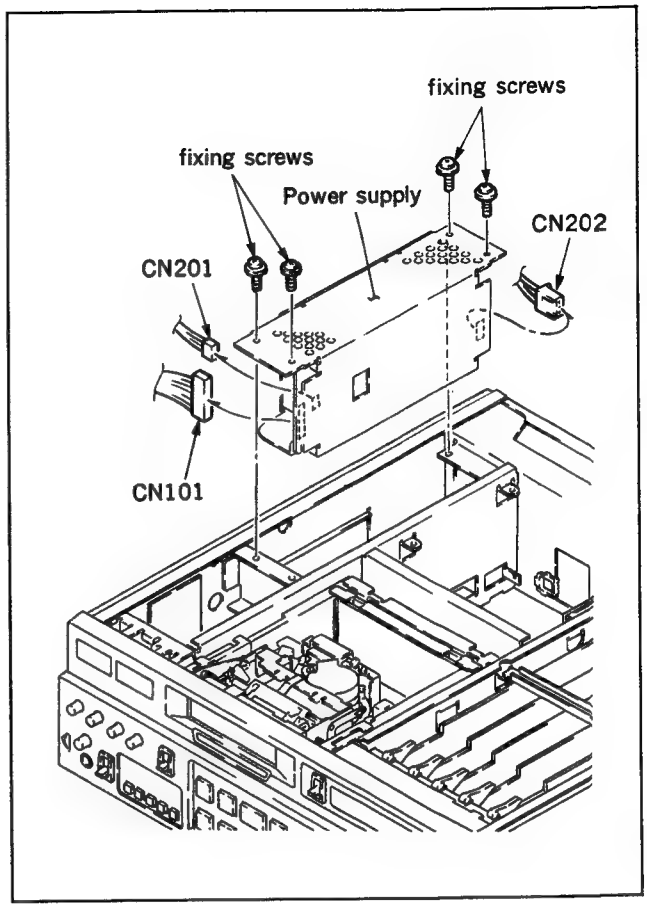
〈Note for installation〉

- Align the four holes at the bottom of the cassette compartment ass'y with the pins on the base plate.
- The harnes should be hold with harness clmper.



2-8. REMOVAL OF THE POWER SUPPLY

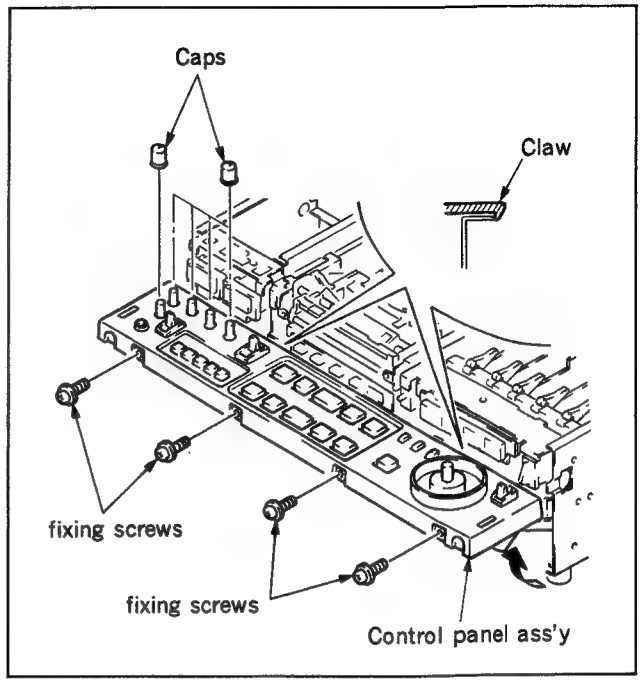
1. Remove the top panel according to section 2-5.
2. Remove the four screws.
3. Pull up the power supply and disconnect connectors CN101, CN201 and CN202 from the SOPS-1030 board.



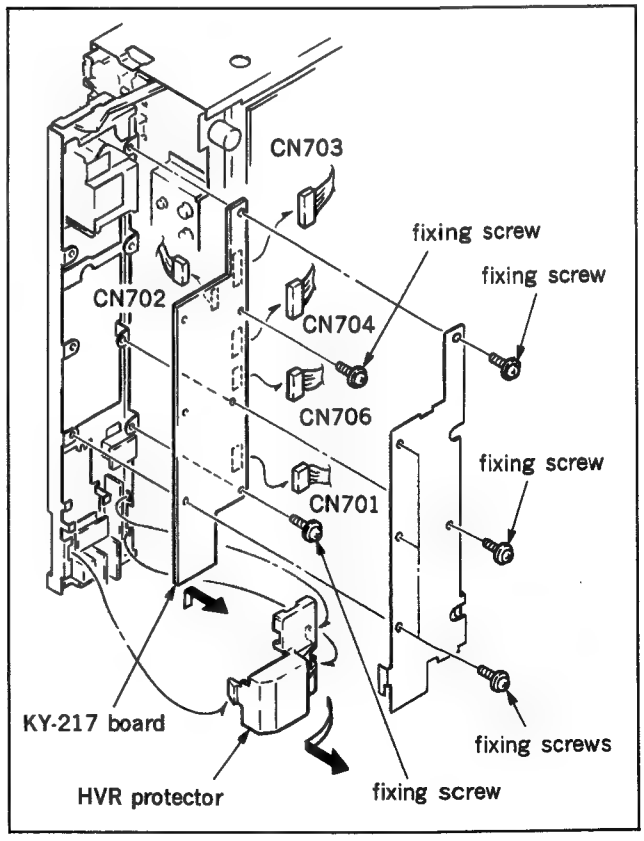
2-9. SERVICING PROCEDURE OF THE PRINTED CIRCUIT BOARD

2-9-1. Removal of the KY-217 Board

1. Remove the dial knob according to section 2-5.
2. Remove the five adjustment knob caps.
3. Remove the four screws at the bottom of the panel.
4. While releasing the claw at the top of the panel from the rear of the control panel ass'y, remove the panel.

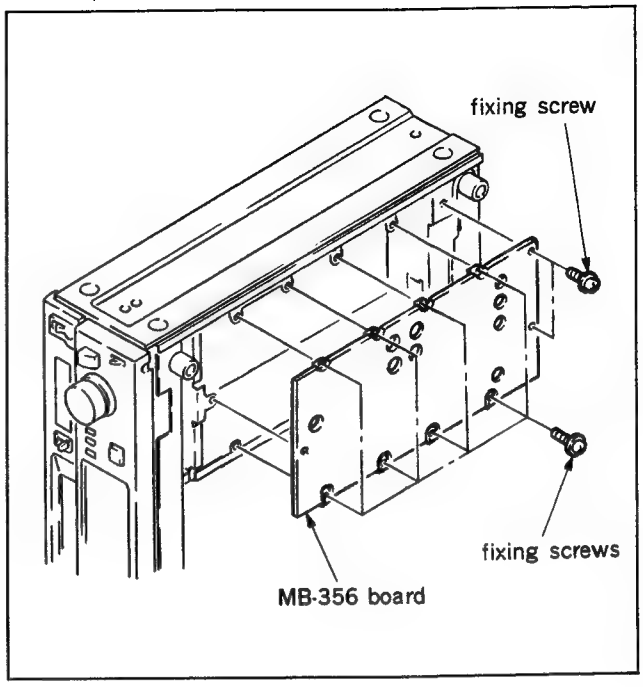


5. Disconnect connectors CN701, CN702, CN703, CN704 and CN706 from the KY-217 board.
6. Remove the HVR protector.
7. Remove the seven screws from the rear, then remove the KY-217 board and KY protector.



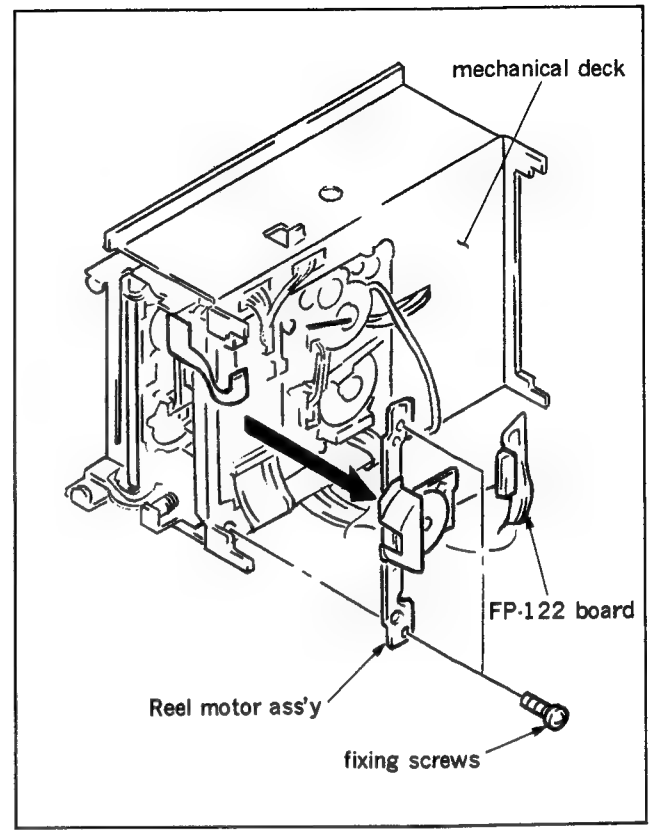
2-9-2. Removal of the MB-356 Board

1. Remove the top and bottom panels according to section 2-5.
2. Remove the four screws, then remove the connector panel.
3. Remove the AU-156, AU-157, MD-81, DM-87, VA-111 and TBC-21 boards. (Refer to section 2-9-5 for removal of the card board.)
4. Disconnect thirteen connectors CN119, CN121 through CN130, CN136 and CN137.
5. Remove the ten screws fixing the MB-356 board from the bottom of the unit.
6. Disconnect the flat cables from six connectors CN130 through CN135.
7. Disconnect connectors CN113 through CN118.

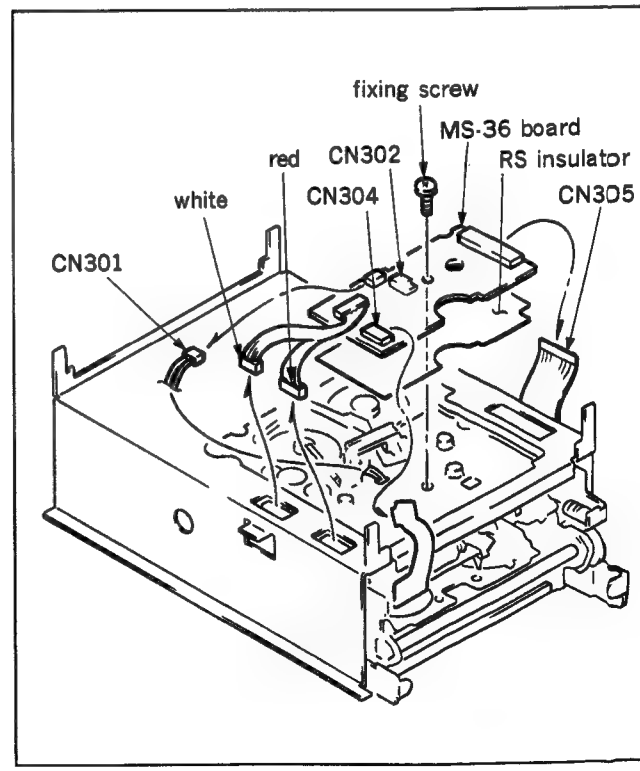


2-9-3. Removal of the RS-31 Board

1. Remove the mechanical deck according to section 2-6.
2. Remove the FP-122 flexible board.
3. Remove the mounting screws of the reel motor ass'y.



4. Disconnect the flat cables from connectors CN301, CN302, CN304 and CN305 of the RS-31 board.
5. Disconnect the connector (red) of the MS-36 board and the connector (white) of the LM-22 board.
6. Remove the mounting screw at the center, then remove the RS-31 board and RS insulator.



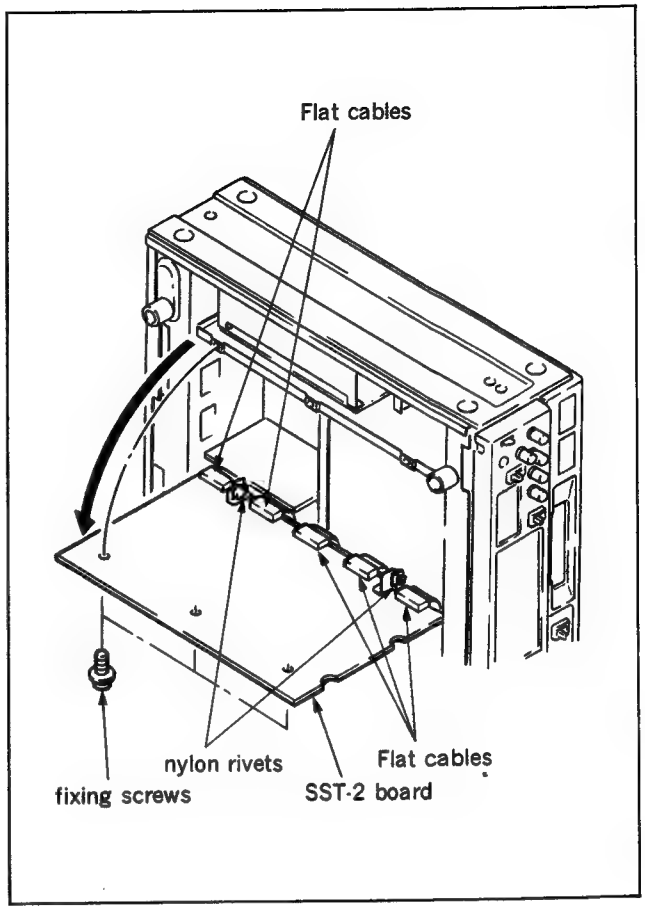
2-9-4. Opening and Removal of the SST-2 Board

〈Opening〉

1. Remove the bottom panel according to section 2-5.
2. Remove the three screws and open the board in the direction of the arrow.

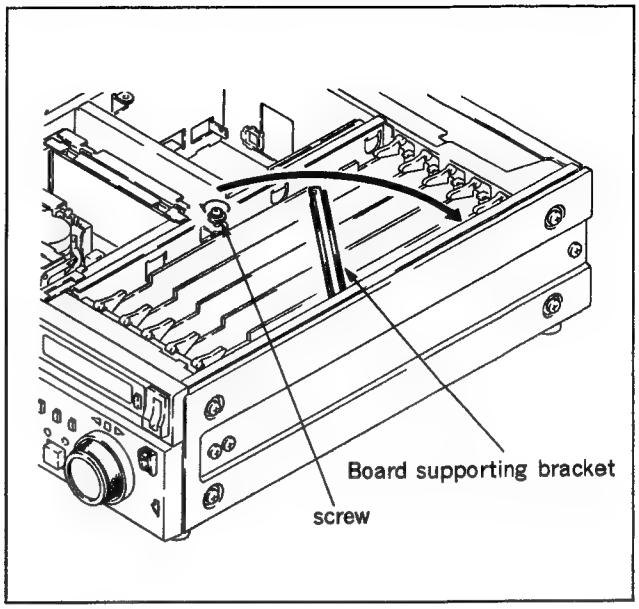
〈Removal〉

1. Open the board, then disconnect the flat cables (five) and all the connectors connecting to the main unit from the SST-2 board.
2. The board can be removed by removing the two nylon rivets.



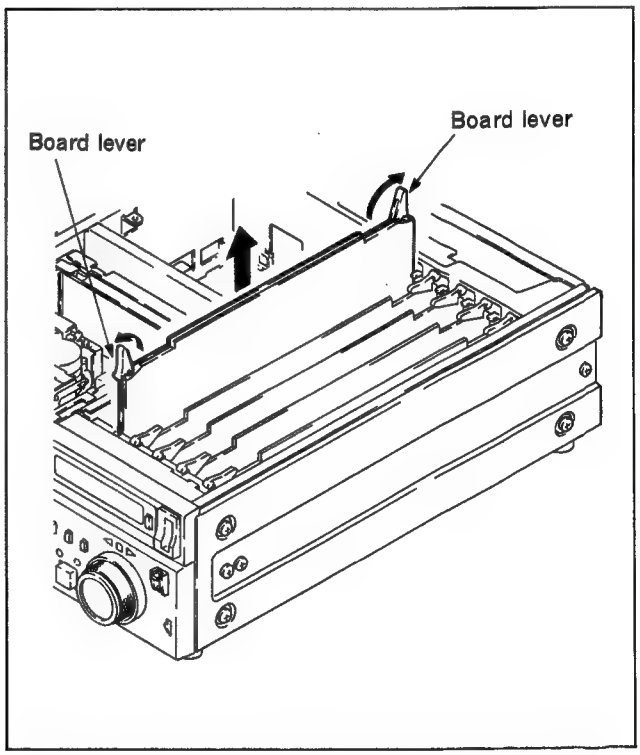
2-9-5. Removal of the Card Board

1. Loosen the screw as shown in the figure, then fold the board supporting bracket.



2. Pull up the board levers in the direction of the arrow, then lift up the board.

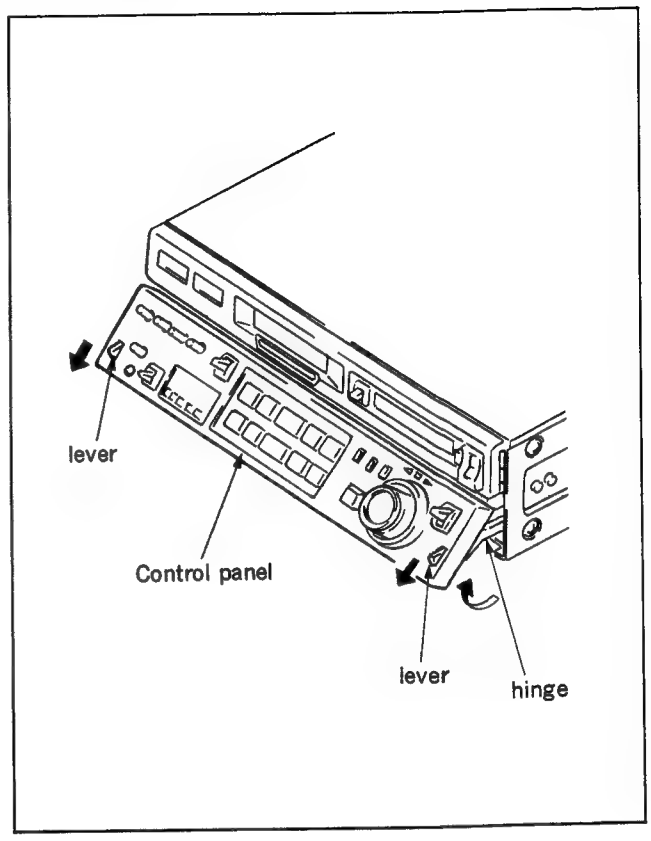
<Note for installation>
Insert the board along the board guide rails, then push it firmly until it engages with the connector on the mother board.



2-10. SLANT ANGLE ADJUSTMENT OF THE CONTROL PANEL ASS'Y

Open the control panel while pushing down the levers at the left and right sides of the front of the control panel ass'y.
The panel can be set to one of three angles, 30, 60, and 90 degrees.
By opening the panel 90 degrees the switch on the sub-panel at the rear of the control panel can be operated.

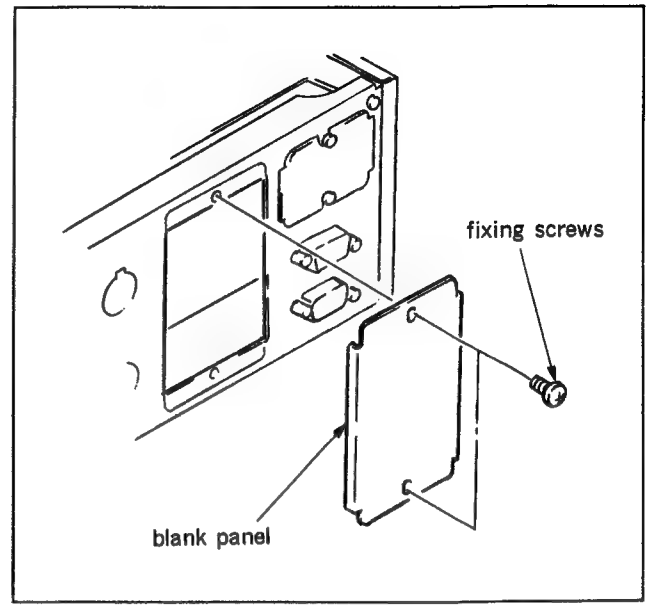
〈Returning〉
The control panel can be returned to its original position by raising the left and right hinges slightly.



2-11. BKU-703A and EVBK-100 INSTALLATION PROCEDURE

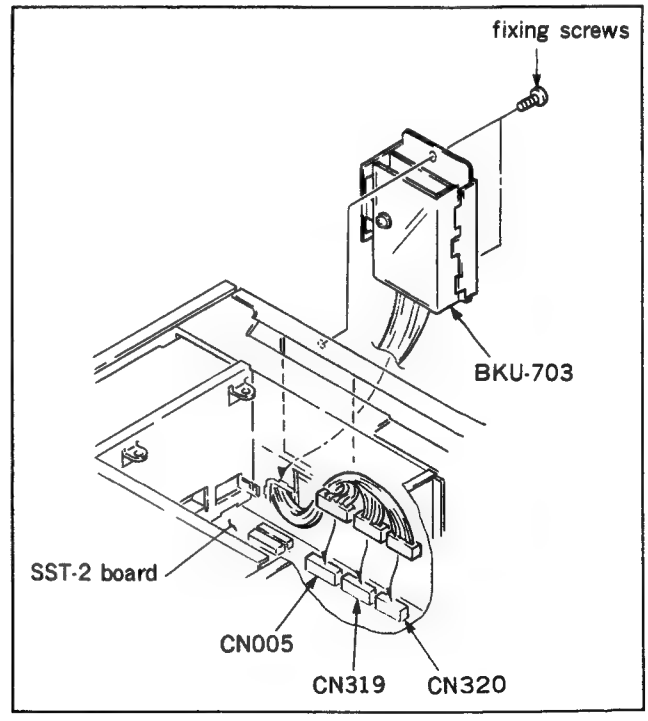
2-11-1. BKU-703A (33-pin Editing Interface) Installation Procedure

1. Remove the top panel according to section 2-5, and remove the blank panel of the connector panel.



2. Install BKU-703A to the location where the blank panel was removed.

For details, refer to the operation manual of BKU-703A.

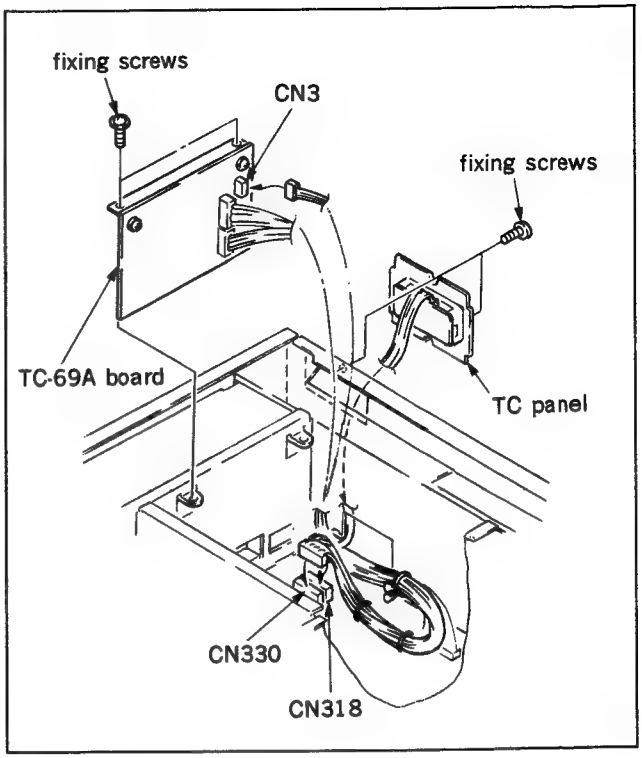


2-11-2. EVBK-100 (SMPTE Time Code Input/Output Board) Installation

Procedure

1. Remove the top and the bottom panels referring to section 2-5.
2. Install the TC-69A board to the location as indicated in the figure.
3. Remove the blank panel of the connector panel and install the TC panel. (EVBK-100 connector panel.)
4. Open the SST-2 board referring to section 2-9-4., and arrauge the harness as shown in the figure.

For details, refer to the operation manual of EVBK-100.



2-12. RACK MOUNTING

This unit can be mounted into the EIA 19-inch standard rack.
The following rail is recommended.

- RM-980 (SONY RACK MOUNT METAL)

- RMM-980 consists of the followings;

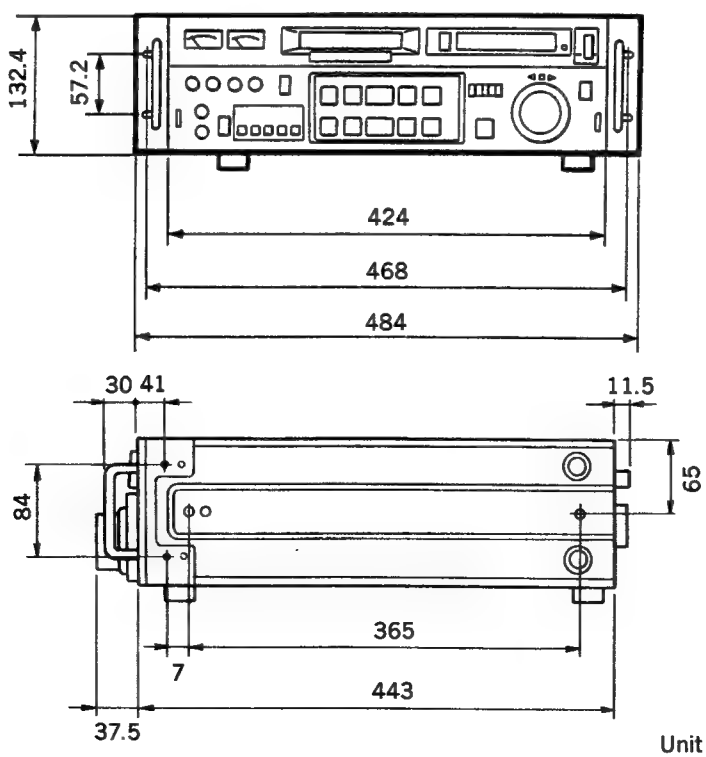
Guide rail	×2 (Maximum travel length 530 mm)
Handle	×2
Screw (+Rk5×14)	×4
Screw (+B4×8)	×4
Screw (+B4×16)	×4
Hexagonal socket head bolt	×8
Plate nut	×4
Ornamental washer (for 5 mm dia)	×4
Washer W4 middle	×8

Caution in the rack mounting :

- When several units are mounted in a rack, it is recommended to equip a ventilation fan for preventing increase of temperature in the rack. Take care that all the units in the rack operate in the range of 10 °C through 35 °C.
- In mounting into the rack, do not remove the top panel and the bottom panel.
- It is recommended that the rack is fastened to the steady floor with bolts. There is danger that the rack can fall on the floor when an unit is withdraw.
- Procedure

  Refer to the supplied manual with RMM-980 regarding mounting into the rack in detail.

- EVO-9850 Dimensions



Unit: mm

2-13. SETTING THE SWITCHES ON THE BOARD

Setting the switches on the board are as follows.
Set the switches according to each system and condition.

2-13-1. AU-156 Board

S1 : Mode selector switch for AFM PB/REC

AUTO mode : PB : Automatically identifies whether the source is stereo or monaural. In the case of stereo, signals are output to L and R respectively.
In the case of monaural, the same signals are output to both L and R.

REC : L and R inputs are recorded separately (stereo recording only).

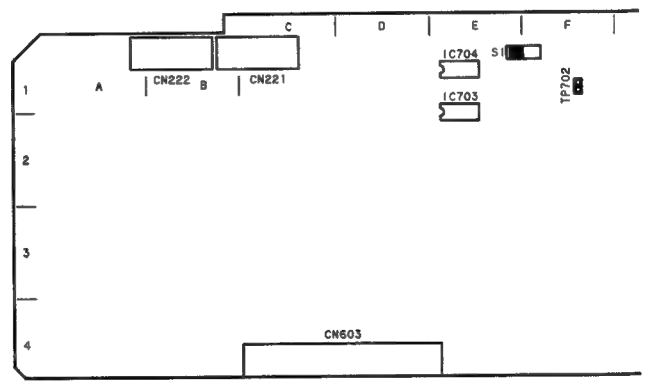
BIL mode : PB : When a bilingually recorded tape is played back, the signals will be output to L and R respectively.

REC : A bilingual recording can be made.

Note : If a bilingually recorded tape is played back in the AUTO mode, or a stereo recorded tape is played back in the BIL mode, the correct sound will not be played back.

Factory setting

Switch No.	Setting
S1	AUTO

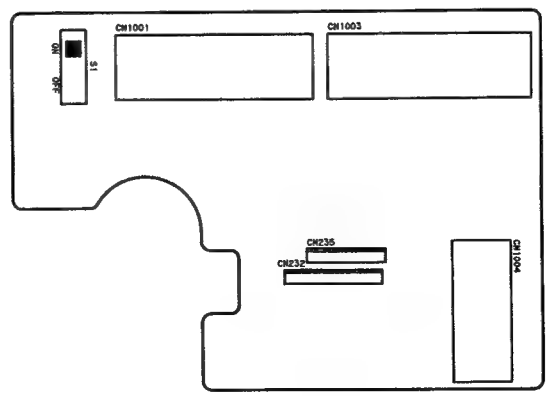


2-13-2. CP-176 Board

S1 : REF IN terminal 75-ohm termination ON/OFF switch
Set to the ON to terminate the board with 75-ohm. Set it to the OFF side when not terminating the board.

Factory setting

Switch No.	Setting
S1	ON



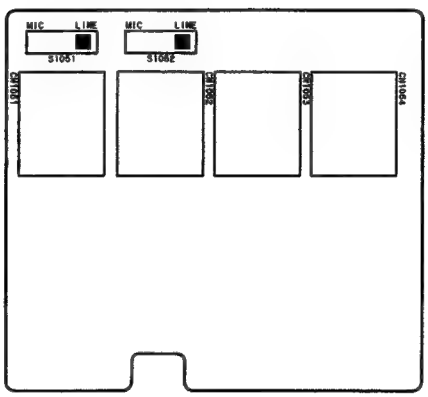
2-13-3. CP-177 Board

S1051 : MIC/LINE select switch for the AUDIO CH1 IN terminal
MIC : Set the switch to this position when a microphone is connected with the AUDIO CH1 IN terminal .
LINE : Set the switch to this position when a video tape recorder is connected with the AUDIO CH1 IN terminal .

S1052 : MIC/LINE select switch for the AUDIO CH2 IN terminal
MIC : Set the switch to this position when a microphone is connected with the AUDIO CH2 IN terminal .
LINE : Set the switch to this position when a video tape recorder is connected with the AUDIO CH2 IN terminal.

Factory setting

Switch No.	Setting
S1051	LINE
S1052	LINE

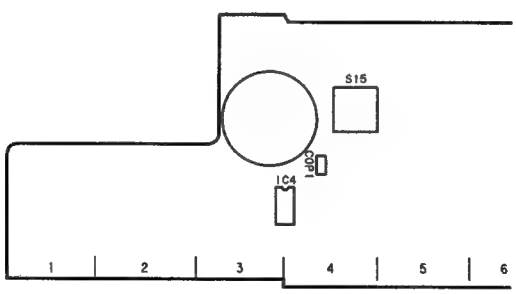


2-13-4. KY-217 Board

COP1 : Lithium battery ON/OFF switch
When the switch is set to ON, cover the switch with a cap. When it is set to OFF, remove the cap.

Factory setting

Switch No.	Setting
COP1	ON



2-13-5. SST-2 Board

S401 (Bit-1 thru. Bit-4)

- S401-1 : REC head adjustment ON switch
  By setting the switch to ON when adjusting the REC head during tape path adjustment, the VIDEO REC switching pulses will be output instead of the VIDEO PB switching pulse.

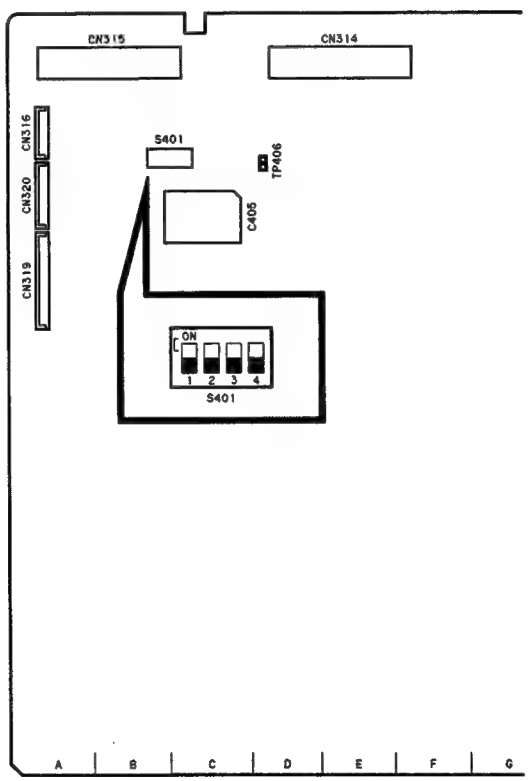
- S401-2 : Tracking control ON and drum AFC OFF switch
  By setting the switch to ON, tracking control volume for tape path adjustment RV701 will operate. At the same time, the drum AFC will become OFF.

- S401-3 : Picture splitting compensation OFF switch
  Set the switch to ON to cancel picture splitting compensation.

- S401-4 : Servo error OFF switch
  Set the switch to ON to cancel error detection in the servo system.

Factory setting

Switch No.	Setting
S401-Bit 1	OFF
S401-Bit 2	OFF
S401-Bit 3	OFF
S401-Bit 4	OFF



2-13-6. VA-111 Board

S101 : U-Matic dubbing chroma OUT Y/C delay time adjustment switch (Bit-1 thru. Bit-7)

Switch No.	1	2	3	4	5	6	7
Delay time (nsec)	0	50	100	150	200	250	300

Note: Never set two or more bits to ON at the same time.

S102 : 8 mm dubbing chroma OUT Y/C delay time adjustment switch (Bit-1 thru. Bit-7)

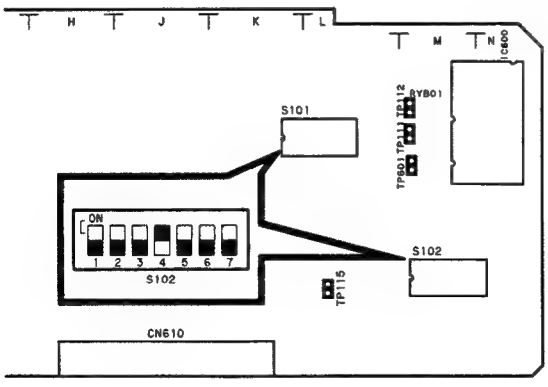
Switch No.	1	2	3	4	5	6	7
Delay time (nsec)	0	50	100	150	200	250	300

Note: Never two or more bits to ON at the same time.

Factory setting

Switch No.	Setting
S101-Bit 1	OFF
S101-Bit 2	OFF
S101-Bit 3	OFF
S101-Bit 4	ON
S101-Bit 5	OFF
S101-Bit 6	OFF
S101-Bit 7	OFF

Switch No.	Setting
S102-Bit 1	OFF
S102-Bit 2	OFF
S102-Bit 3	OFF
S102-Bit 4	ON
S102-Bit 5	OFF
S102-Bit 6	OFF
S102-Bit 7	OFF

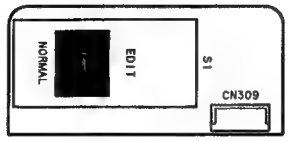


2-13-7. SW-540 Board

S1 : NORMAL/EDIT mode select switch
NORMAL : Set to this position when using the EVO-9850 as a player VTR.
EDIT : Set to this position when using the EVO-9850 as an editing VTR.

Factory setting

Switch No.	Setting
S1	NORMAL

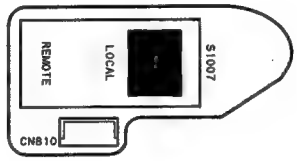


2-13-8. SW-543 Board

S1007 : Function control LOCAL/REMOTE select switch
LOCAL : Set to this position when editing with the function keys on the main unit of EVO-9850.
REMOTE : Set to this position when editing with the remote controller.

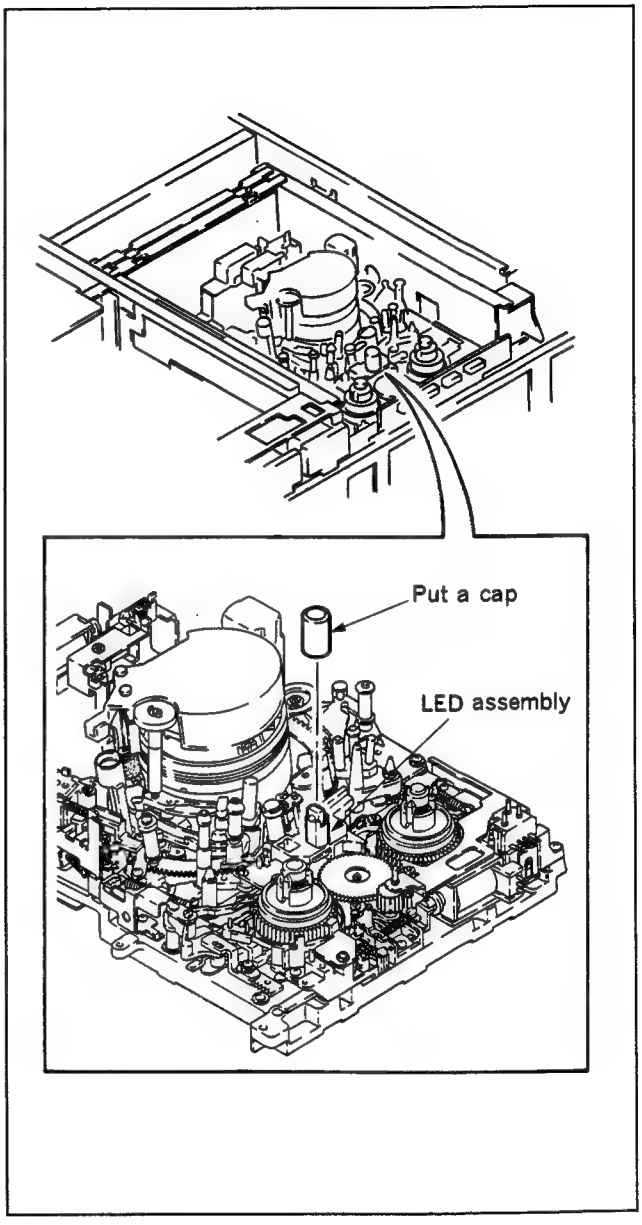
Factory setting

Switch No.	Setting
S1007	LOCAL



2-14. DISABLE THE FUNCTIONS OF THE TAPE BEGINNING SENSOR AND END SENSOR

If the LED ass'y is covered with a cap etc., the functions of the tape beginning sensor and tape end sensor will stop.



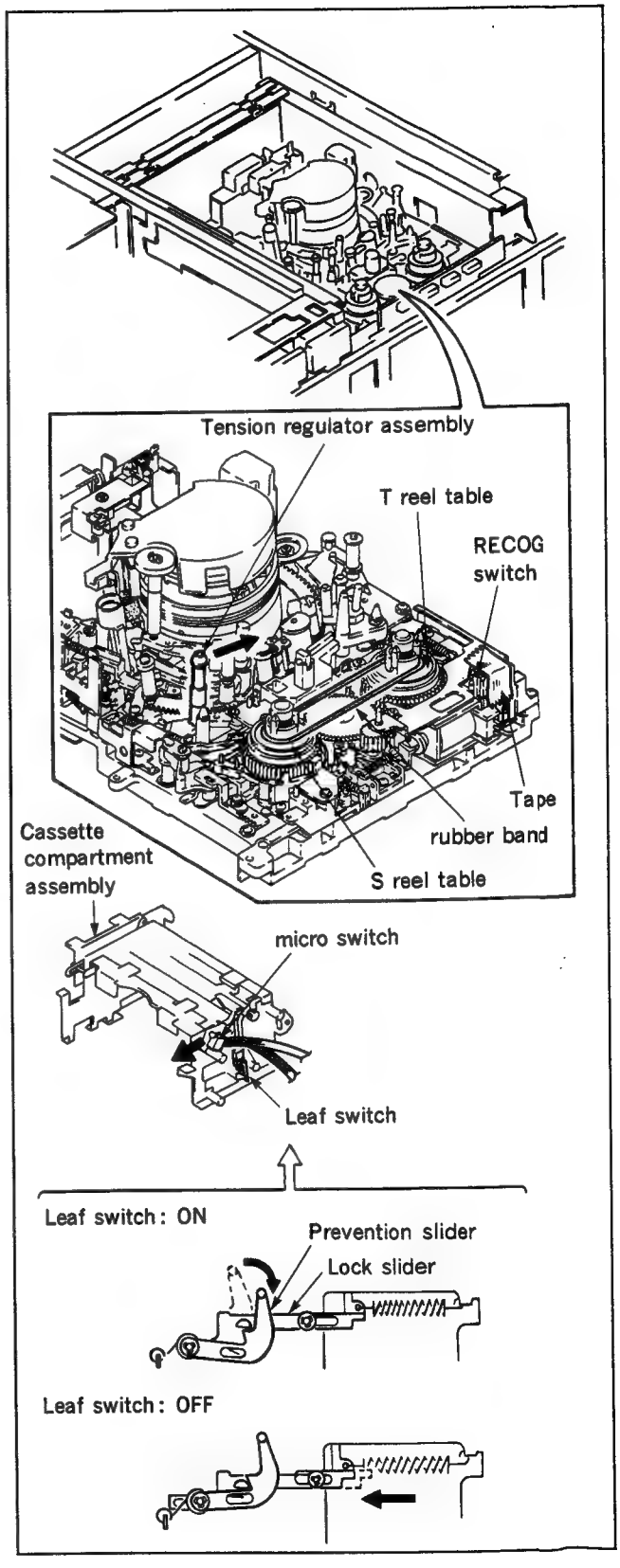
2-15. OPERATING PROCEDURE OF THE VTR WITHOUT THE CASSETTE COMPARTMENT ASS'Y OR CASSETTE TAPE

Note: The unit will not operate if there is a strong light source nearby.

1. Setting the unit into threading mode
1) Remove the top panel and front panel according to section 2-5.
2) Remove the cassette compartment ass'y from the unit according to section 2-7. Never disconnect the connectors during this work.
3) Turn the power ON.
4) Stick an adhesive tape over the RECOG switch so as to keep the pin depressed.
5) Press the microswitch on the cassette compartment ass'y once in the direction of the arrow, then release it.
6) Turn ON the leaf switch on the cassette compartment ass'y.

2. Setting the unit into the playback or recording mode
1) Put the unit into threading end mode according to step-1.
2) Hook the rubber band between the S reel table and the T reel table.
3) Press the REC or PLAY button on the control panel. When the T reel table starts to rotate, press the tension regulator arm ass'y in the direction of the arrow. The T tension regulator band will be released, then the S reel table starts rotating.
4) Press the STOP button on the control panel to stop.

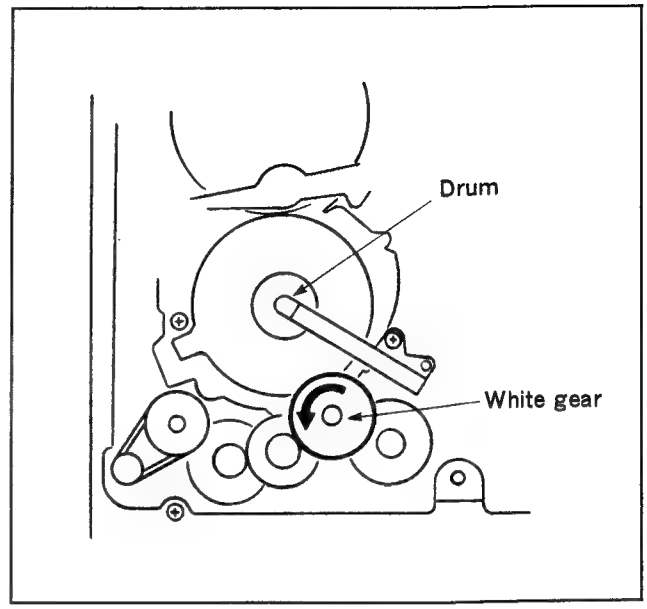
3. Setting the unit into the EJECT mode
Press the EJECT button on the control panel.



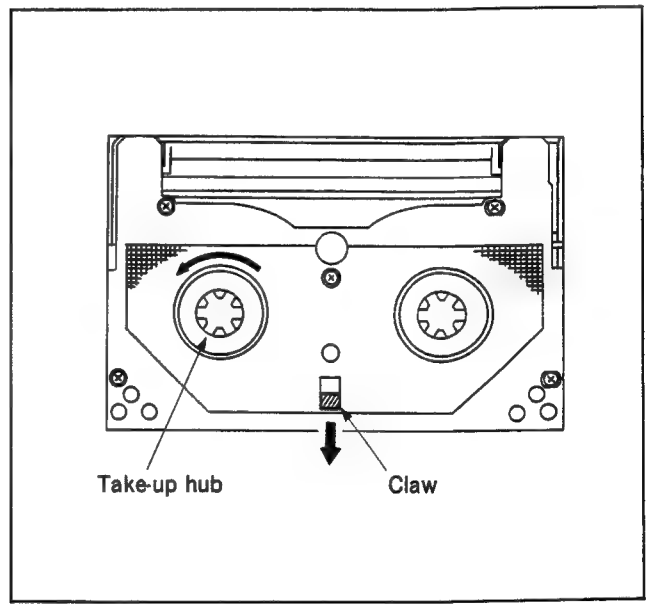
2-16. REMOVING PROCEDURE OF A CASSETTE TAPE WHEN UNIT CANNOT BE EJECTED

If the tape winds around the drum and can not be ejected, it can be removed using the following procedure.

1. Remove the top panel and bottom panel according to section 2-1.
2. Open the SST-2 board according to section 2-5-4.
3. Rotate the white gear alongside the drum at the rear of the mechanical deck counterclockwise, then release the tape wound around the drum.



4. Remove the cassette compartment ass'y with the cassette tape. During this work, take care that the tape does not get caught in the mechanical deck or otherwise damaged.
5. While pressing the claw at the rear of the cassette in the direction of the arrow as shown in the figure, rotate the T side reel hub counterclockwise to wind the tape into the cassette.



6. Remove the cassette from the cassette compartment ass'y. Try the following two procedures.
   1) To release the lock on the cassette holder, rotate the worm gear with the fingers in the direction of the arrow while pushing the lock slider with the fingers in the direction of the arrow. Then the cassette holder will rise a little at a time, and eventually be ejected.

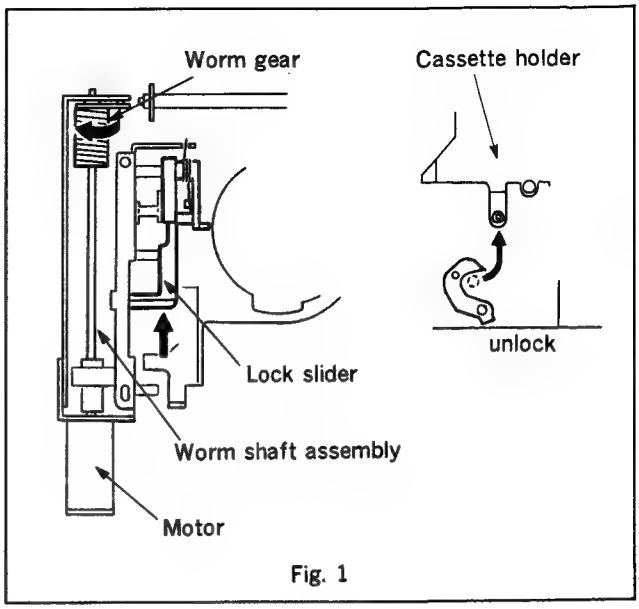


Fig. 1

   2) Remove the two mounting screws from the motor mounting plate, then remove it (Fig. 2), motor (Fig. 1), and the worm shaft ass'y.
   Press the lock slider indicated in Fig. 1 in the direction of the arrow, then raise the cassette holder with the hand and eject the tape.

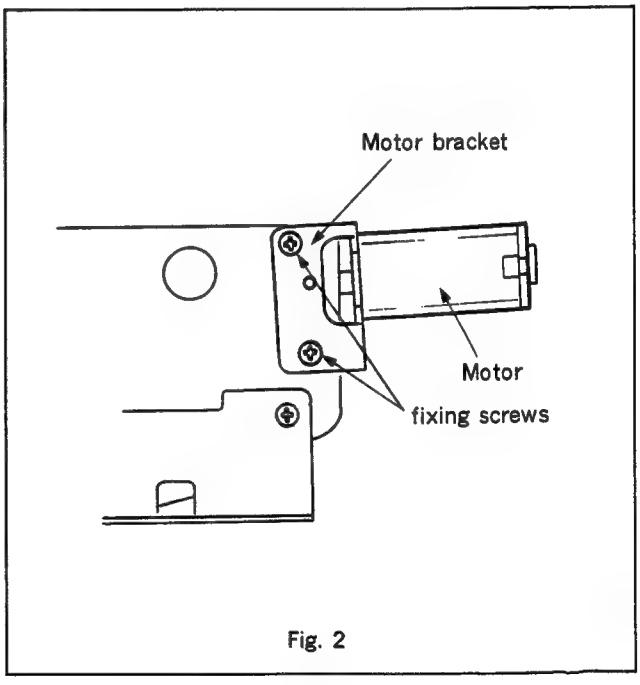
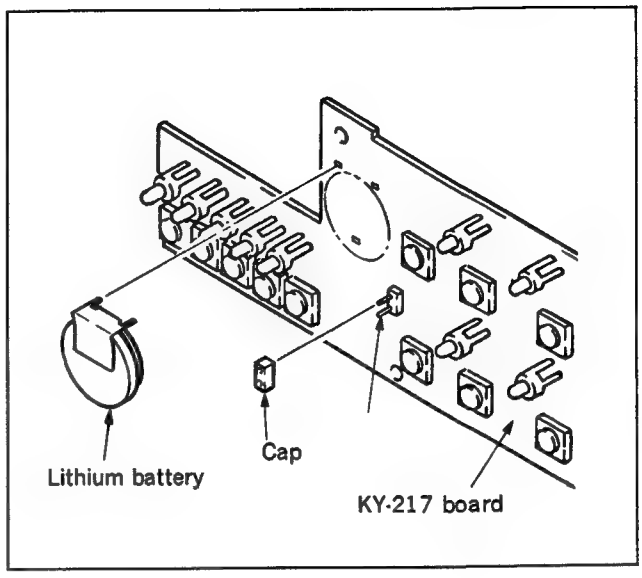


Fig. 2

2-17. REPLACEMENT OF LITHIUM BATTERY

The KY-217 board in this unit has a lithium battery for maintaining the time code data and the menu setting data. If the battery runs down, the data stored in the memory will be lost. It is recommended that replace the battery with a new one within about five years since you started to use the unit, to back up the data.



Note: While the battery is being replaced, the data stored in the memory will remain backed up by a capacitor, however it will only hold its charge for three or four days.

To replace the battery in a short time, be sure to prepare a new battery before performing.

The method of replacing the battery is as follows.

Preparation of parts
Lithium battery (RC-2450): Sony part No. 1-528-229-11

1. Remove the KY-217 board according to the procedure of section 2-5-5.
2. Remove a cap from COP1 (A-4).
3. Remove lithium battery BT1 (A-4), and mount a new battery.
4. Cover COP1 (A-4) with the cap.

2-18. SERVICE PARTS

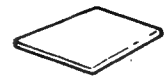
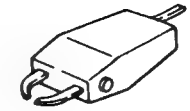
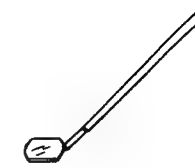
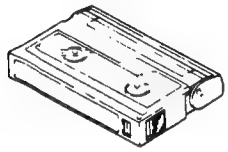
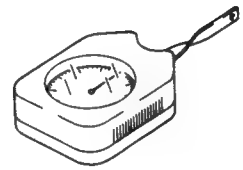
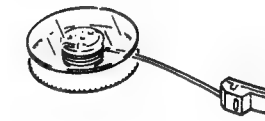
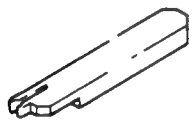
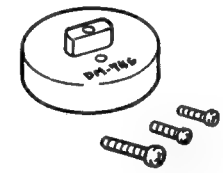
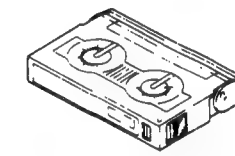
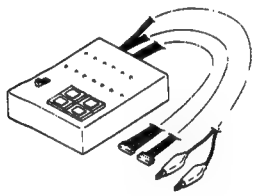
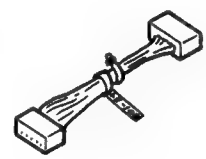
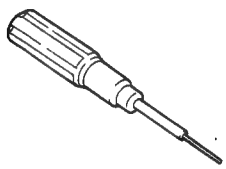
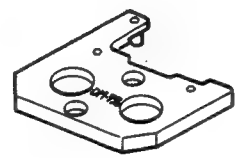
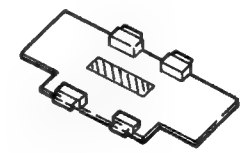
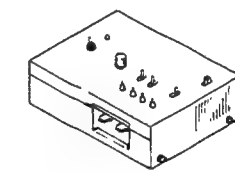
(1) Safety Related Components Warning
Components marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts
Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

(3) Stock of Parts
Parts marked with "o" SP (supply Code) column of the spare parts list not normally required for routine service work. Orders for parts marked withe "o" will be processed, but allow for additional delivery time.

2-19. FIXTURE

Ref. No.	Parts No.	Description	Application
J-1	Y-2031-001-1	Cleaning Fluid	Cleaning
J-2	7-741-900-53	Wiping Cloth	Cleaning
J-3	Commerially sold	Head Degausser	Head degausing
J-4	J-6080-840-A	Small Adjustment Mirror	Tapepath adjustment
J-5	8-967-992-12	Alignment Tape, WR2-3NS	Switching position adjustment
	8-967-995-02	Alignment Tape, WR5-1NP	Tape path adjustment
	8-967-995-12	Alignment Tape, WR5-6N	Video frequency response adjustment
	8-967-995-13	Alignment Tape, WR5-7NE	Video frequency response adjustment (Hi8)
	8-967-995-42	Alignment Tape, WR5-5NSP	Video adjustment
	8-967-995-43	Alignment Tape, WR5-8NSE	Servo, audio and video adjustment (SP)
	8-967-995-52	Alignment Tape, WR5-8NLE	Servo, audio and video adjustment (LP)
J-6	J-6080-827-A	Dial Tension Gauge	Measurment of torque
J-7	J-6080-831-A	Tension Measurement Reel	FWD Back tension adjustment
J-8	J-6080-832-A	Tension Measurement Reel	Brake torque check
J-9	J-6257-610-A	No.10 Gear Phase Tool	Threading ring assembly replacement
J-10	J-6080-826-A	No.6 Guide Lock Screwdriver	Tape path adjustment
J-11	J-6257-460-A	Upper Drum Replacement Tool	Rotary upper drum replacement
J-12	J-6080-824-A	FWD, REV Take up Torque Cassette	S • T reel table Take up torque check
J-13	J-6080-825-A	Mode Selector	Mechanical check, adjustment and replacement
J-14	J-6269-000-A	REC Head PB Harness	SW Pulse adjustment
J-15	J-6080-883-A	RF/SWP Connector	Tape path adjustment
J-16	3-703-375-06	Parallel Pin	Rotary upper drum replacement
J-17	7-700-766-01	Hexagonal Screwdriver (0.89mm)	Tape path adjustment
J-18	J-6257-560-A	S-Tension Adjustment tool	S Tension sensor output adjustment
J-19	J-6268-660-A	EX-311 (Extension Board)	Card Board adjustment
J-20	J-6080-891-A	Track Shift Tool	Tape path adjustment

J-1	J-2 	J-3 	J-4 
J-5 	J-6 	J-7	J-8 
J-9 	J-10	J-11 	J-12 
J-13 	J-14 	J-15	J-16
J-17 	J-18 	J-19 	J-20 

2-20. SYSTEM SETTING BY MENU

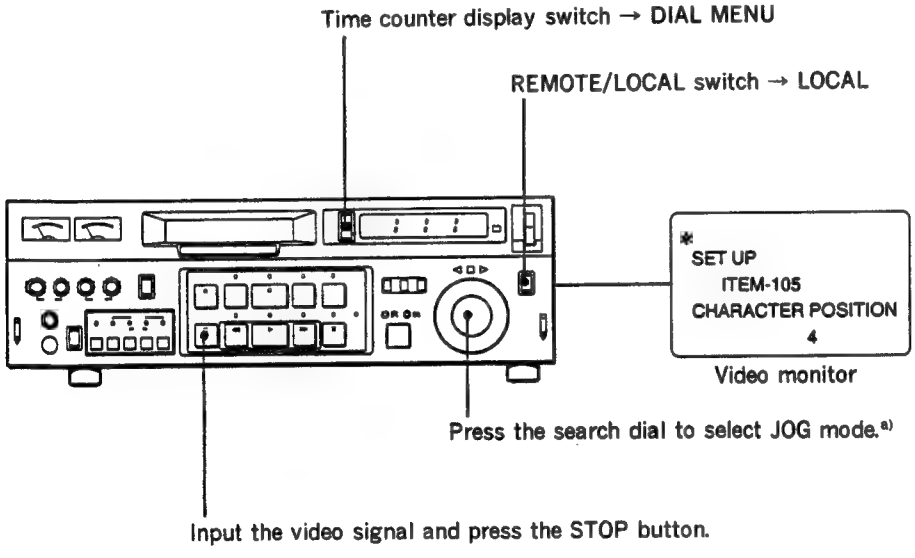
Using the menu operation, it is possible to set the time code and to change the settings for tape running and editings. The menu has the basic function menu and the enhanced function menu. Use the basic function menu usually.

Note: The setting by the menu is kept up with the battery built-in this unit. Exchange the battery about every five years. (Refer to section 2-17)

2-20-1. How to Display or Change the Menu Data

To change the factory settings, proceed as fllows.

Selecting the dial menu operation mode
Perform dial menu operations in stop (EE) mode. To select dial menu operation mode, set the controls as follows.



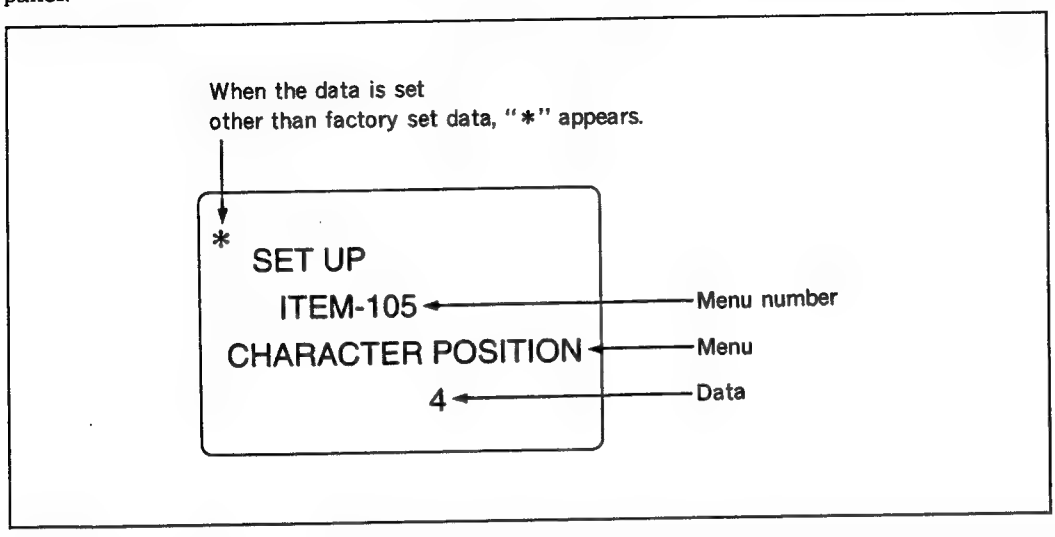
a) In dial menu operation mode, the SHUTTLE/JOG indicators do not light even when you press the search dial. Check the mode by rotating the search dial. If you can feel a detent, the unit is in SHUTTLE mode. When can not feel a detent, it is JOG mode.

Switch settings for displaying or changing data

With the above setting, the unit enters dial menu operation mode. The ◁ □ ▷ indicators light. One of the menu number 101 to 200 will appear on the monitor. On the time counter, data for the item displayed will appear, the number flashing.
When the menu number 200 is set to "ENHANCED", one of the items of menu number 101 to 230 will appear when the unit enters dial menu operation mode.

Monitor display

The menu number, menu and data are superimposed on the video monitor connected with the MONITOR VIDEO or TV connector. During dial menu operation, the menu number and data appear on the time counter display on the front panel.



NOTE: The unit has not necessarily malfunctioned if the dial menu data superimposed on the monitor display disappears when the unit enter still mode. This may happen when guard band noise appears at the position of the vertical sync signal in still mode.

2-20-2. Basic Function Menu (BASIC FUNCTION)

□ is the factory setting condition.

MENU		DATA		Contents
Menu No.	Menu	Counter display	Monitor display	
101	TIME CODE PRESET	[00000000] ⟆ 23595929	[TCG00:00:00:00] ⟆ TCG23:59:59:29	Time code setting 00H00M00S00Fr thru. 23H59M59S29Fr can be set. Note : When the enhanced function menu No.202 is attempted, be sure to preset No.101.
102	U-BIT PRESET	[00000000] ⟆ FFFFFFFF	00000000 ⟆ FF FF FF FF	User bit setting hexadecimal eight-digit data can be set and to record it on a tape.
105	CHARACTER POSITION	[00] /01/02/~15	[OFF] /1/2/~15	Set the character position that is displayed on the monitor. (only the vertical direction) When set of OFF, the chracter is no displayed.
106	CHARACTER SIZE	[0] /1	[SMALL] /LARGE	Set the character size that is displayed on the monitor. SMALL : Small characters LARGE : Large characters
200	SETUP GRADE	[0] /1	[BASIC] / ENHANCED	Grade of setting the dial menu operation. BASIC: Enable to select the basic functions from the menu No.101 through No.200. ENHANCED: Enable to select all the menus of the basic and the enhanced function menu from menu No.101 through No.230. Note : Select BASIC (BASIC FUNCTION) usually. Select ENHANCED when using only the enhanced function menu.

2-20-3. Enhanced Function Menu (ENHANCED FUNCTION)

The enhanced function menu operation becomes enable when the menu No.200 of the basic menu is set to "ENHANCED".

□ is the factory setting condition.

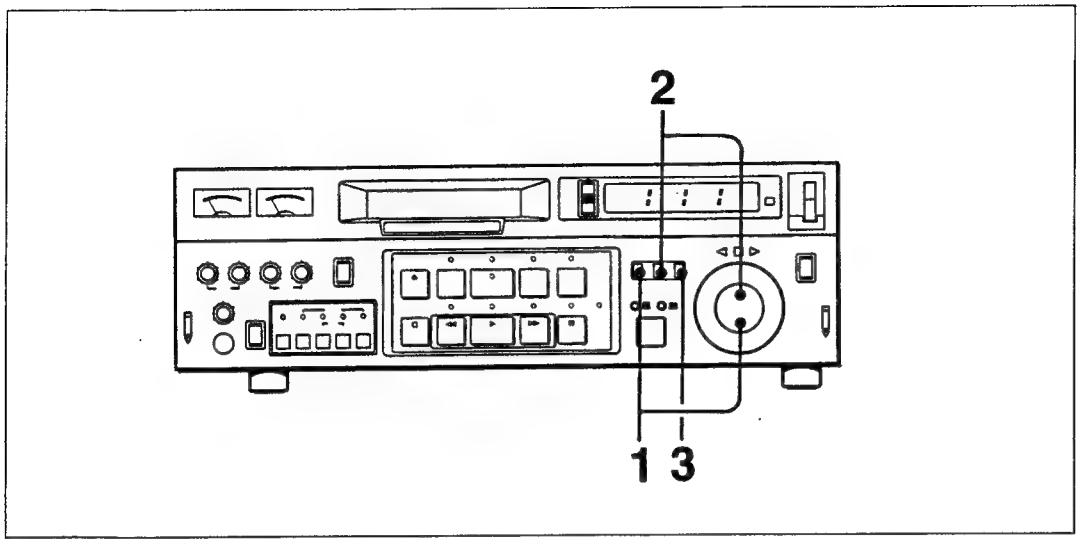
MENU		DATA		Contents
Menu No.	Menu	Counter display	Monitor display	
201	ERROR STATUS	..... Error 02 Eroor 10 Error 20 Error 21 Error 22 Error 23 Error 90 Error 99	NONE TAPE SLACK HUMID SYSTEM ERROR NO DISPLAY SYSTEM ERROR 50 SYSTEM ERROR 60 NO DISPLAY NO DISPLAY	Self diagnosis function If an error occurs in normal operation, ERROR code is displayed on the time counter in every mode of normal operation. Then, put the unit into the dial menu operation mode and select this menu, The error status related to the error code will be displayed on the monitor. (Refer to section 2-22 in detail.) Note : The data content of this menu cannot be changed. When normal : .....(NONE)
202	NDF/DF SELECT	[0]/1	[NDF]/DF	Selection of either the drop frame or none drop frame of built-in 8 mm time code generator NDF : None drop frame mode DF : Drop frame mode Note : Time code should be preset in menu No.101 after NDF/DF has been set. • This setting is invalid when the time code generator is used in the REGEN mode.
205	HOUR METER (DRUM)	[00000] 〉 15000	[00000H] 〉 15000H	Upper drum rotation hour is displayed. This is reference for upper drum replacement. Upto from 0H to 15000H can be displayed. Note : The data content of this menu cannot be changed.
206	HOUR METER	[00000] 〉 15000	[00000H] 〉 15000H	Total time of the power on sequence can be displyed. Up to from 0H to 15000H can be displayed. Note : The data content of this menu cannot be changed.

MENU		DATA		Contents
Menu No.	Menu	Counter display	Moritor display	
207	STILL TIMER	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 [15]	0.5SEC. 1SEC. 5SEC. 10SEC. 20SEC. 30SEC. 40SEC. 50SEC. 1MIN. 2MIN. 3MIN. 4MIN. 5MIN. 6MIN. 7MIN. [8MIN.]	To prevent the video head from clogging and tape damage, unit enters into tape protection mode after tape stop mode (PLAY PAUSE or SERCH STILL) continues for a certain period of time. This menu sets the transiton time of the stop to tape protection mode. The time can be set from 0.5 seconds to 8 minutes.
209	SELECTION FOR SEARCH DIAL ENABLE	0/[1]	DIRECT/ [VIA SEARCH BUTTON]	Selection of the search dial operation There are two ways of entering the search mode. One is by turning the sarch dial directly, and the other is by pressing the SEARCH button. DIRECT: When the unit is in the other modes than the record or the edit mode, the search mode can be obtained by turning the search dial. VIA SEARCH BUTTON: The search mode can be obtained by pressing the SEARCH button.
214	PREROLL TIME	00/01/~/[5]~/15	0/1/~/[5]~/15	Pre-roll time setting Setting time is between 0 and 15 seconds.
218	PINCH ON DELAY	00/01/~/[4]/~15	0/1/2/~/[4]~/15	Duration of time after PLAY command is issued, and until tape actually starts running, can be set.

MENU		DATA		Contents
Menu No.	Menu	Counter display	Moritor display	
224	TAPE PROTECTION	[0] /1	[STEP FWD] / LONG PAUSE	Selection of the tape protection mode Operation mode after the time set in menu No.207 has elapsed, is selected here. STEP FWD : The tape runs to the forward with 1/20 times normal speed. LONG PAUSE: The tape is released from the head (long pause mode).
228	DIGITAL YNR SELECT	0/ [1]	OFF/ [ON]	Field noise reducer operation of the luminance signal is switched ON/OFF. ON : The operation can be switched ON/OFF with the NOISE REDUCTION switch of the TBC remote control (REMOTE/LOCAL) OFF : The operation of YNR is forced to be OFF.
229	DIGITAL ENHANCER	[0] /1	[OFF] /ON	Operation of the vertical enhancer circuit of luminance signal can be switched ON/OFF.
230	FRAMING	0/ [1]	OFF/ [ON]	ON : Perform framing lock during recording OFF : Do not perform framing during recording

2-20-4. Changing Menu Settings

To change a menu item, proceed as follows.



① While holding down the MENU button, rotate the search dial to find the item you wish to change.
Rotate the dial clockwise to display higher-numbered menus, or counterclockwise to display lower-numbered menus.

② While holding down the DATA button, rotate the search dial to scroll forwards or backwards through the item's data.
Rotate the dial clockwise to display-numbered data, or counterclockwise to display lower-numbered data.
To select the point at which to set the time code or user bit data, turn the search dial without holding down the DATA button.

③ Repeat steps 1 and 2 until you are satisfied with the settings for all menu items.
Press the SET button to save the selected items.
The ◁ □ ▷ indicators flash for a second, and the displayed data is stored to memory.
Then, the flashing stops.

• To restore the factory settings

When the "*" mark appears on the monitor in step 2, it indicates that the selected data is not factory-set data.
To restore the factory settings, select data for which * is not displayed.

• To terminate dial menu operation

Set the time counter display switch to TC or COUNTER.
The displayed data disappears and the unit enters ordinary operation mode.

2-21. SYSTEM ERROR

If an error is detected, error message is displayed on the time counter display of the front panel.
If an error message is displayed, select menu No.201 of the dial menu.
Then the error status that corresponds to the displayed error code will be displayed monitor screen. From the error status information, cause of the error can be known.

Error No. and the causes

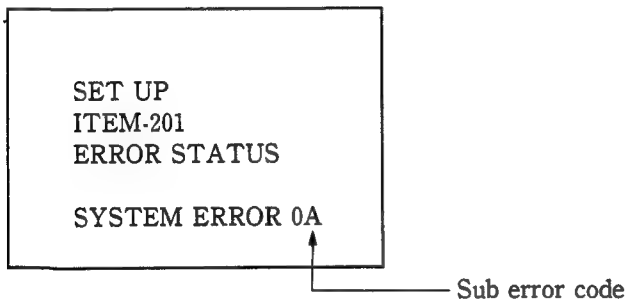
Counter display	Monitor display	Description
Error 02	TAPE SLACK	Excessive tape tension
Error 10	HUMID	Condensation
* Error 20	SYSTEM ERROR	Erroneous mechanism operation Further known by the sub error code. (see the followings)
Error 21	——	RAM is defective when the POWER turned ON.
Error 22	SYSTEM ERROR	Failure in the communication of BKU-703A
Error 90	——	Communication error between SY board and KY board
Error 99	——	Lack of 1/2 VD servo signal to be sent to SY board.

(note) Error 21, 90 and 99 are displayed only on the time counter.

2-21-1. Sub Error Code

When "Error 20 SYSTEM ERROR" is displayed on the time counter display, the sub error code is displayed at the lower-right side of the monitor.

Monitor



The defective position can be specified easily by using the flowchart in section 2-21-2 according to this sub error code.

The sub error code is the hexadecimal 2-digit data and is displayed in "Hex" notation.
The upper digit shows Error 1 content and the lower digit shows Error 0 content.

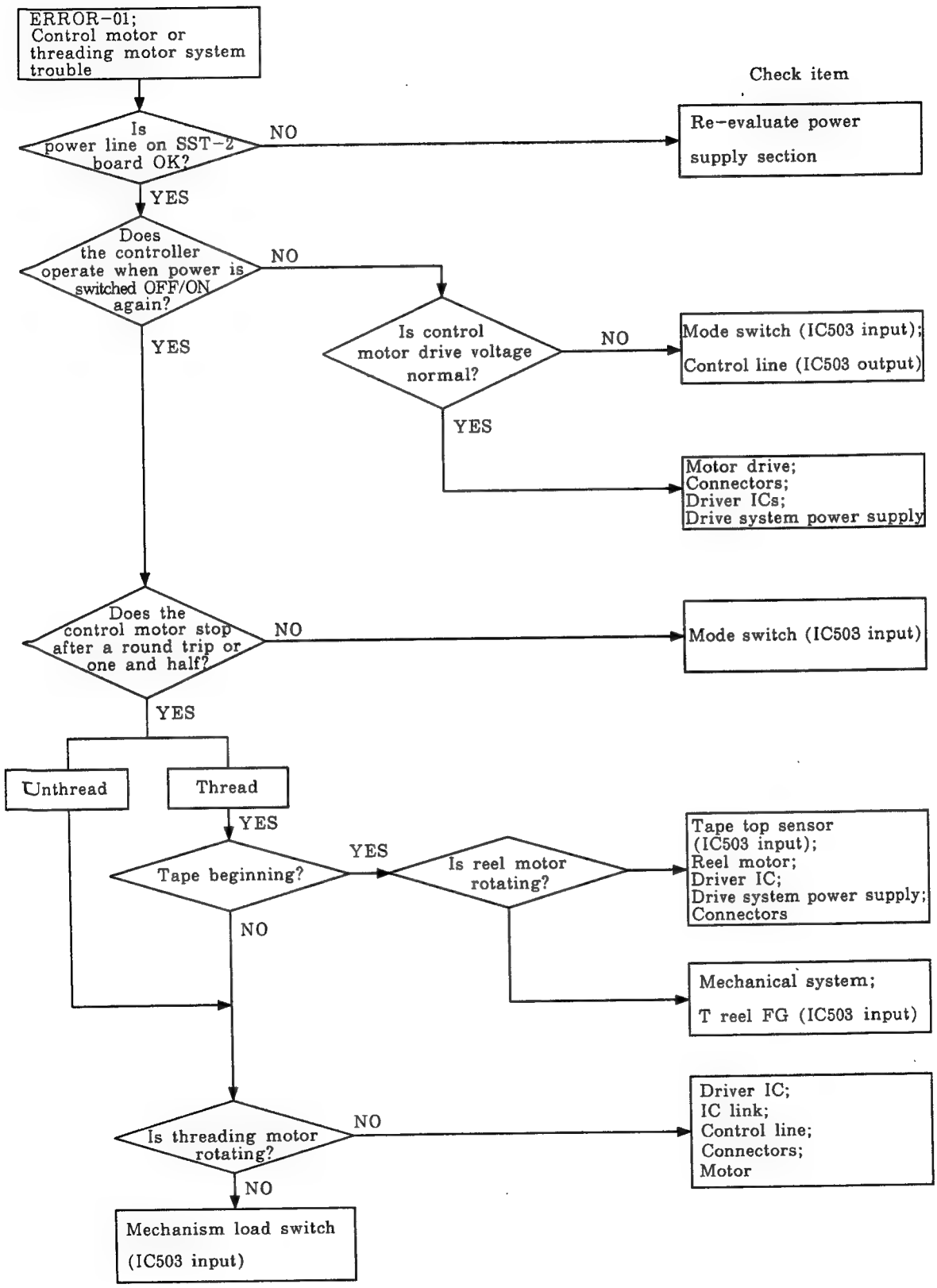
Regarding Error 0

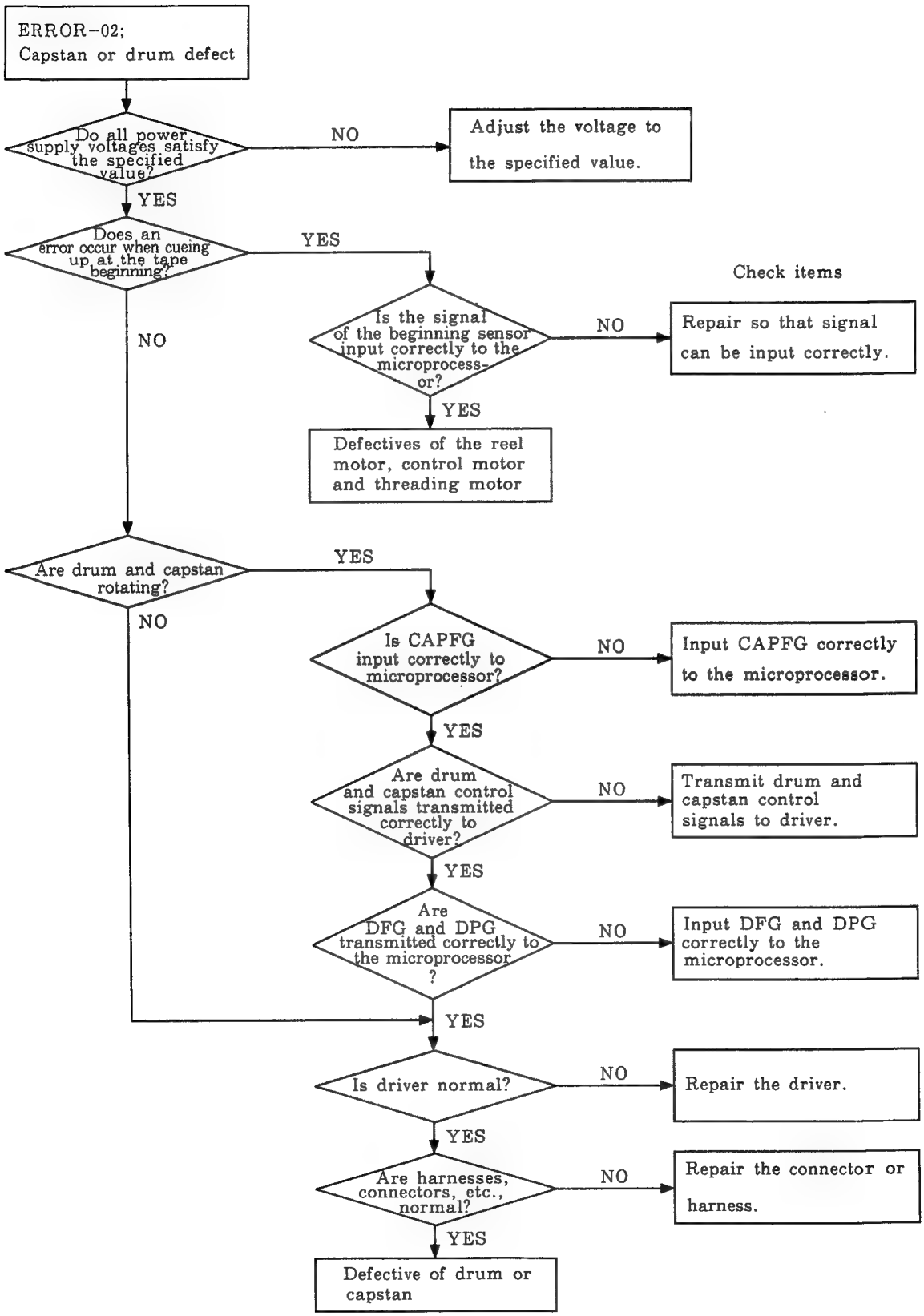
0	No trouble.
1	Failure in the control signals of the threading motor or control motor system. Or defective reel motor. Or communication error of the Beginning sensor or End sensor
2	Tape top detection error. Or failure in control signals of drum, capstan.
3	Defective cassette compartment, cassette motor, the cassette control cable or the mechanical switch, etc.
5	Communication error between M1 and the mechanical deck block

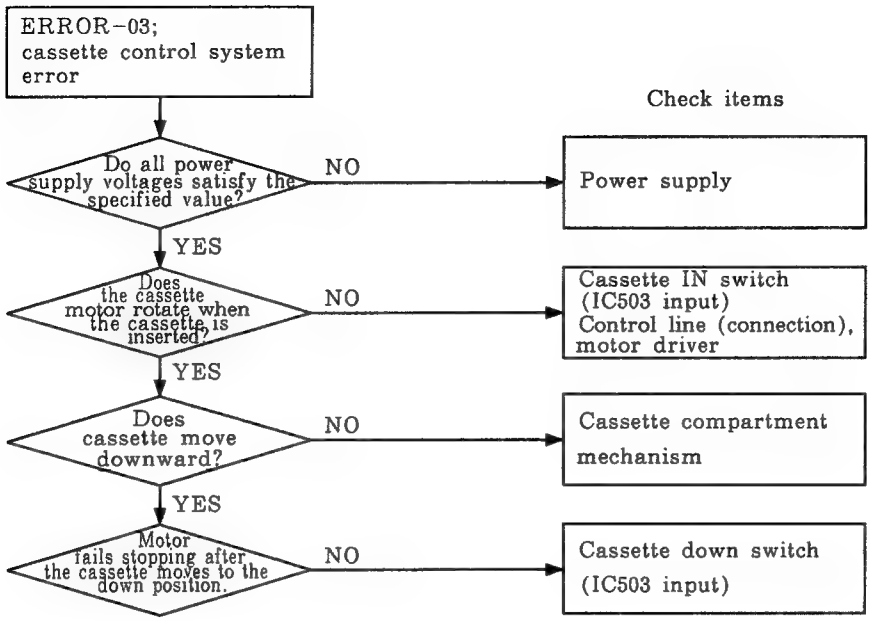
Regardign Error 1

0	No trouble (Error 1 code is always indicated)

2-21-2. Flow Chart




ERROR-02;
Capstan or drum defect
Do all power supply voltages satisfy the specified value?
NO
Adjust the voltage to the specified value.
YES
Does an error occur when cueing up at the tape beginning?
YES
NO
Check items
Is the signal of the beginning sensor input correctly to the microprocess-or?
NO
Repair so that signal can be input correctly.
YES
Defectives of the reel motor, control motor and threading motor
Are drum and capstan rotating?
YES
NO
Is CAPFG input correctly to microprocessor?
NO
Input CAPFG correctly to the microprocessor.
YES
Are drum and capstan control signals transmitted correctly to driver?
NO
Transmit drum and capstan control signals to driver.
YES
Are DFG and DPG transmitted correctly to the microprocessor ?
NO
Input DFG and DPG correctly to the microprocessor.
YES
Is driver normal?
NO
Repair the driver.
YES
Are harnesses, connectors, etc., normal?
NO
Repair the connector or harness.
YES
Defective of drum or capstan


ERROR-03;
cassette control system error
Check items
Do all power supply voltages satisfy the specified value?
NO
Power supply
YES
Does the cassette motor rotate when the cassette is inserted?
NO
Cassette IN switch (IC503 input) Control line (connection), motor driver
YES
Does cassette move downward?
NO
Cassette compartment mechanism
YES
Motor fails stopping after the cassette moves to the down position.
NO
Cassette down switch (IC503 input)

2-22. TIMING CHART

The microcomputer (IC503) is built-in the system control circuit of this equipment (SST-2 board)
The operations of the system control are divided roughly into the mechanical operation and the electrical system operation.
The mechanical operation can be checked according to section 2-21-1 sub code error. And the control operation of electrical system (microcomputer) can be checked by using the timing chart.
The signal names of input and output and the pins of the microcomputer are described in the timing chart. Check the control operation of electrical system after confirming that signal changes along the timing chart.

Movement modes about ✱ 1 throught ✱ 6 in the Timing Chart are shown by these tables.

✱ 1 : Control Motor Control

Control Motor Rotating Direction	CONT L ⟵⟶ CONT R (clockwise direction) (counterclockwise direction)								
Control Position (code) / Control Switch Input	EJECT (4)	BLANK (7)	LOAD/ UNLOAD (2)	BLANK (7)	FF/REW (6)	BLANK (7)	STOP (3)	BLANK (7)	FWD (1)
CONT C (IC003 ⑭)	H	H	L	H	H	H	L	H	L
CONT B (IC003 ⑬)	L	H	H	H	H	H	H	H	L
CONT A (IC003 ⑫)	L	H	L	H	L	H	H	H	H

✱ 2 : Loading Motor Control

Loading Motor Rotating Direction	Unthreading ⟵⟶ Threading								
Motor Position (code) / Loading Switch Input	LOADING TOP (1)	BLANK (7)	UNLOAD WAIT (5)	BLANK (7)	DRUM START (4)	BLANK (7)	T REEL START (6)	BLANK (7)	LOADING END (3)
LOAD SW C (IC003 ⑱)	L	H	H	H	H	H	H	H	L
LOAD SW B (IC003 ⑰)	L	H	L	H	L	H	H	H	H
LOAD SW A (IC003 ⑯)	H	H	H	H	L	H	L	H	H

✱ 3 : Cassette compartment Motor Control Output

UP	DOWN	Motor Drive
L	L	No drive
L	H	Drives in down direction
H	L	Drives in up direction
H	H	Short brake

✱ 4 : Loading Motor Control Output

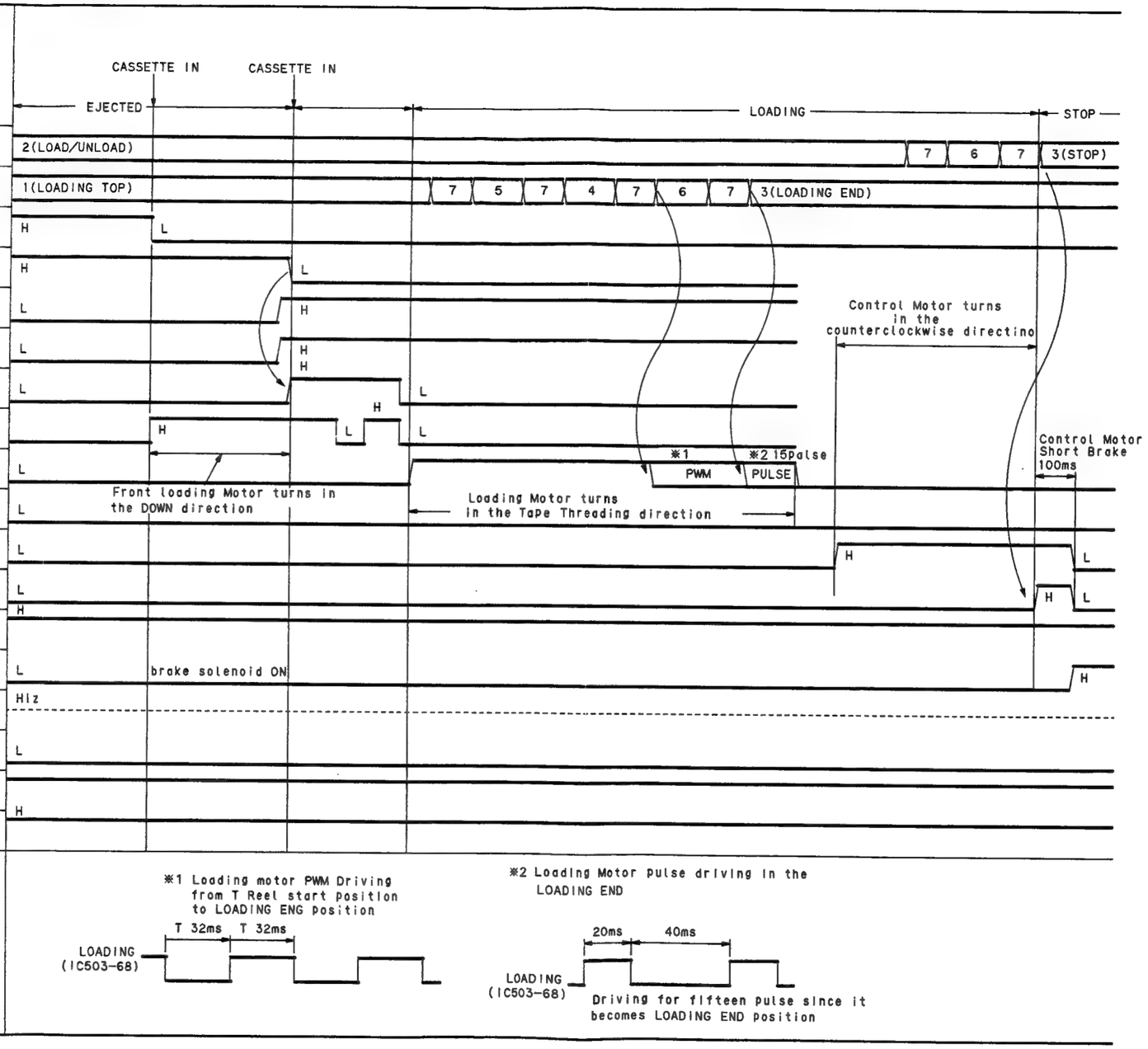
LOAD	UNLOAD	Motor Drive
L	L	No drive
L	H	Drives in unloading direction
H	L	Drives in loading direction
H	H	Short brake

✱ 5 : Control Motor Output

CONT L	CONT R	Motor Drive
L	L	No drive
L	H	Drives the slider at a control position to the right
H	L	Drives the slider at a coutrol position to the left
H	H	Short brake

1. EJECTED → CASSETTE IN/CASSETTE DOWN → LOADING → STOP

SIGNAL	L	H	MEASURING POINT SST-2 BOARD (PIN NO.)
MODE SW A,B,C	※1		IC503-59,58,57
LOADING SW A,B,C	※2		IC503-62,61,60
CASSETTE IN	ON	OFF	IC503-56
CASSETTE DOWN	ON	OFF	IC503-55
$\overline{\text{TAPE TOP}}$	ON	OFF	IC503-47
$\overline{\text{TAPE END}}$	ON	OFF	IC503-46
CASS.COM. UP	※3		IC503-64
CASS.COM. DOWN			IC503-63
LOADING	※4		IC503-68
UNLOADING			IC503-67
CONTROL R	※5		IC503-65
CONTROL L			IC503-66
START	ON	OFF	IC503-19
HOLD	ON	OFF	IC503-20
REEL $\overline{\text{FWD}}$/RVS	FWD	RVS	Q504,505
$\overline{\text{REEL BRAKE}}$	ON	OFF	IC503-77
CAPSTAN SPEED	——		IC503-10thru.6
$\overline{\text{CUE}}$	CUE	STOP	IC503-5



※1 Loading motor PWM Driving from T Reel start position to LOADING ENG position

※2 Loading Motor pulse driving in the LOADING END

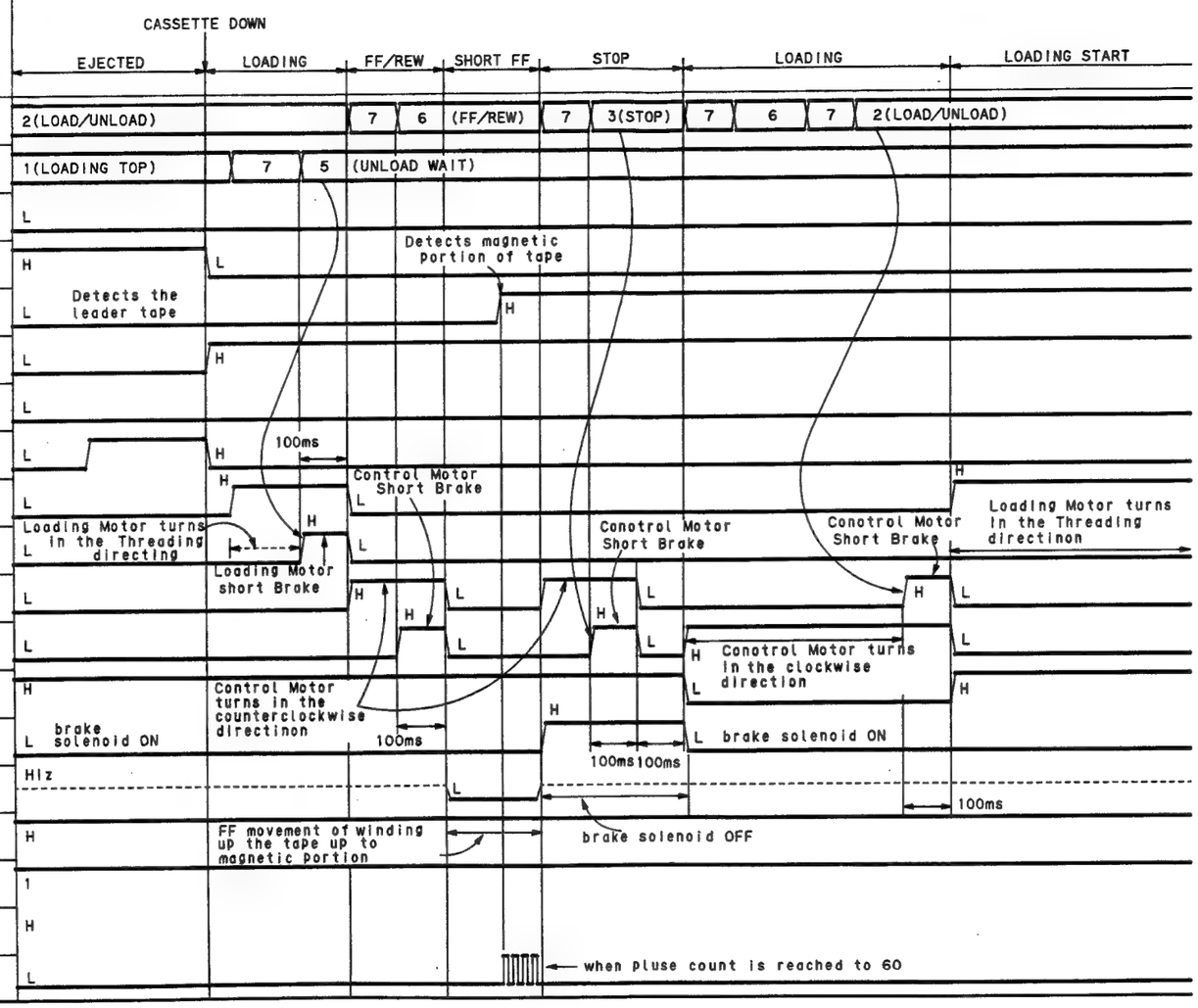
Driving for fifteen pulse since it becomes LOADING END position

NOTE: CASS.COM.means Cassette Compartment.

2-52

2. EJECTED → CASSETTE DOWN → LOADING → UNLOADING → UNLOAD WAIT → SHORT FF → LOADING

SIGNAL	L	H	MEASURING POINT SST-2 BOARD (PIN NO.)
MODE SW A,B,C	※1		IC503-59,58,57
LOADING SW A,B,C	※2		IC503-62,61,60
CASSETTE IN	ON	OFF	IC503-56
CASSETTE DOWN	ON	OFF	IC503-55
$\overline{\text{TAPE TOP}}$	ON	OFF	IC503-47
$\overline{\text{TAPE END}}$	ON	OFF	IC503-46
CASS.COM. UP	※3		IC503-64
CASS.COM. DOWN			IC503-63
LOADING	※4		IC503-68
UNLOADING			IC503-67
CONTROL R	※5		IC503-65.
CONTROL L			IC503-66
$\overline{\text{START}}$	ON	OFF	IC503-19
$\overline{\text{HOLD}}$	ON	OFF	IC503-20
REEL $\overline{\text{FWD}}$/RVS	FWD	RVS	Q504,505
$\overline{\text{REEL BRAKE}}$	ON	OFF	IC503-77
CAPSTAN SPEED	——		IC503-10thru.6
$\overline{\text{CUE}}$	CUE	STOP	IC503-5
T-REEL FG			IC503-24P

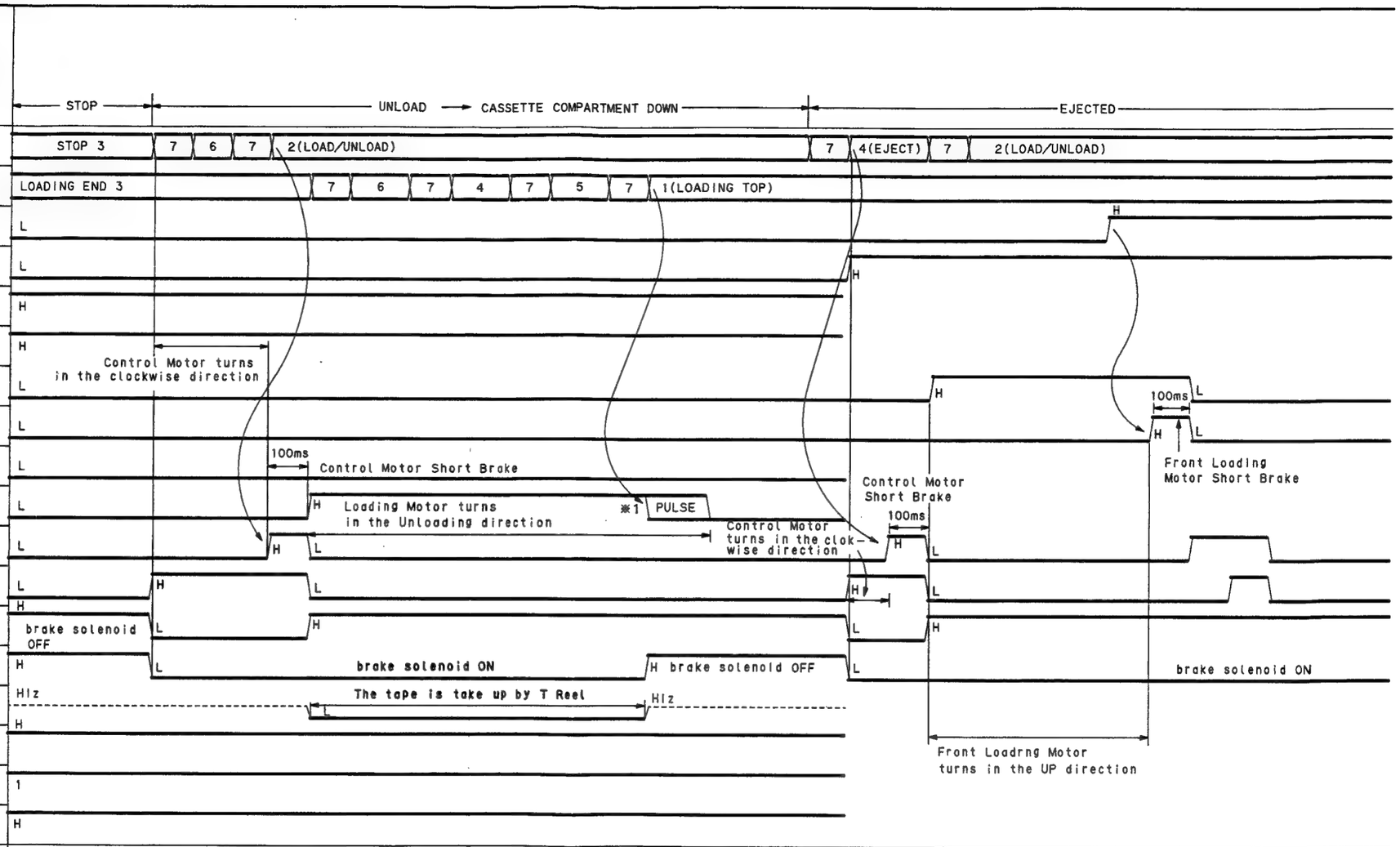


NOTE: CASS.COM.means Cassette Compartment.

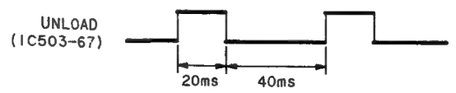
2-53

3. STOP → UNLOAD → CASSETTE COMPARTMENT DOWN → EJECTED

SIGNAL	L	H	MEASURING POINT SST-2 BOARD (PIN NO.)
MODE SW A,B,C	※1		IC503-59,58,57
LOADING SW A,B,C	※2		IC503-62,61,60
CASSETTE IN	ON	OFF	IC503-56
CASSETTE DOWN	ON	OFF	IC503-55
$\overline{\text{TAPE TOP}}$	ON	OFF	IC503-47
$\overline{\text{TAPE END}}$	ON	OFF	IC503-46
CASS.COM. UP	※3		IC503-64
CASS.COM. DOWN			IC503-63
LOADING	※4		IC503-68
UNLOADING			IC503-67
CONTROL R	※5		IC503-65
CONTROL L			IC503-66
START	ON	OFF	IC503-19
HOLD	ON	OFF	IC503-20
REEL $\overline{\text{FWD}}$/RVS	ON	OFF	Q504,505
$\overline{\text{REEL BRAKE}}$	ON	OFF	IC503-77
CAPSTAN SPEED	——		IC503-10thru.6
$\overline{\text{CUE}}$	CUE	STOP	IC503-5



※1 Pulse Driving Timing

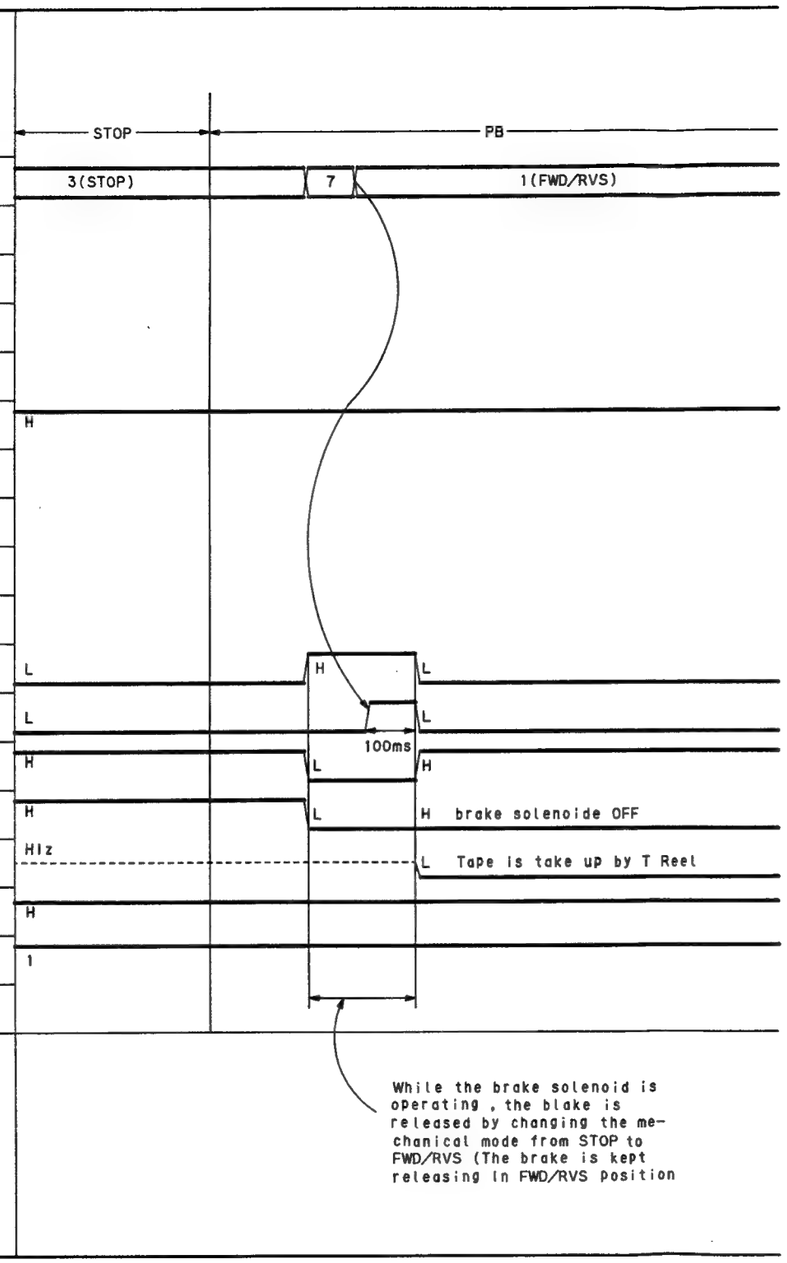


NOTE: CASS.COM. means Cassette Compartment.

2-54

4. STOP → PB

SIGNAL	L	H	MEASURING POINT SST-2 BOARD (PIN NO.)
MODE SW A,B,C	※1		IC503-59,58,57
LOADING SW A,B,C	※2		IC503-62,61,60
CASSETTE IN	ON	OFF	IC503-56
CASSETTE DOWN	ON	OFF	IC503-55
$\overline{\text{TAPE TOP}}$	ON	OFF	IC503-47
$\overline{\text{TAPE END}}$	ON	OFF	IC503-46
CASS.COM. UP	※3		IC503-64
CASS.COM. DOWN			IC503-63
LOADING	※4		IC503-68
UNLOADING			IC503-67
CONTROL R	※5		IC503-65
CONTROL L			IC503-66
START	ON	OFF	IC503-19
HOLD	ON	OFF	IC503-20
REEL $\overline{\text{FWD}}$/RVS	FWD	RVS	Q504,505
$\overline{\text{REEL BRAKE}}$	ON	OFF	IC503-77
CAPSTAN SPEED	——		IC503-10thru.6
$\overline{\text{CUE}}$	CUE	STOP	IC503-5

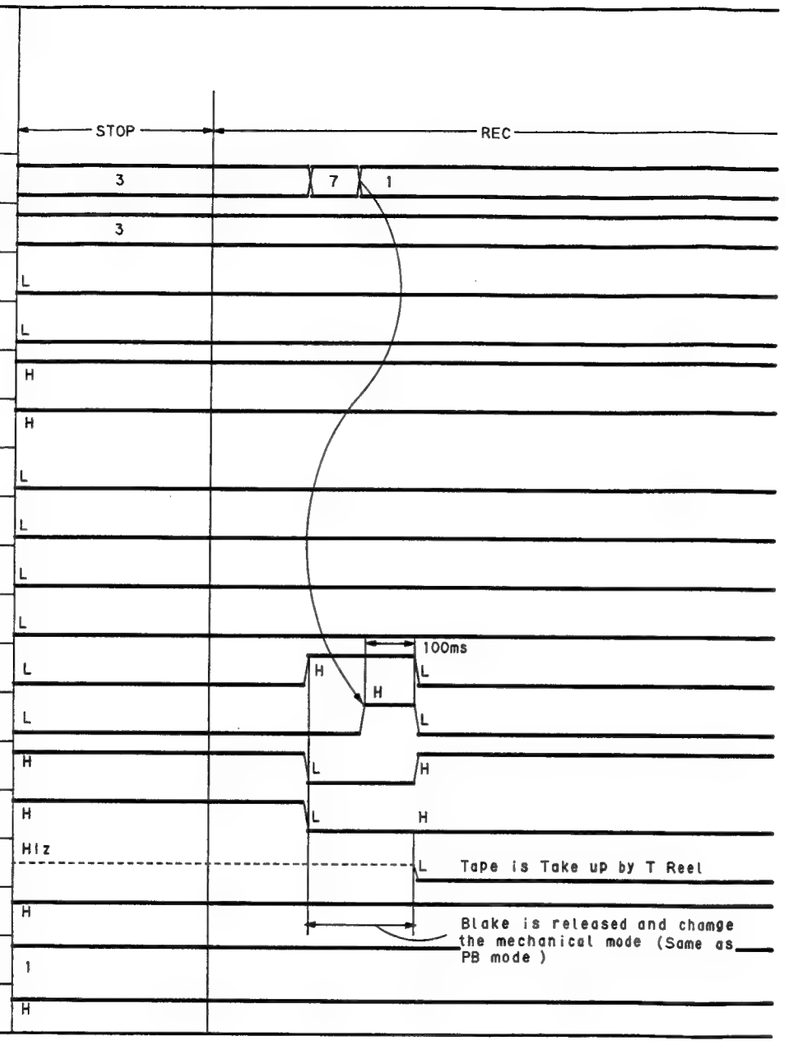


NOTE: CASS.COM. means Cassette Compartment.

2-55

5. STOP → REC

SIGNAL	L	H	MEASURING POINT SST-2 BOARD (PIN NO.)
MODE SW A,B,C	※1		10503-59,58,57
LOADING SW A,B,C	※2		10503-62,61,60
CASSETTE IN	ON	OFF	10503-56
CASSETTE DOWN	ON	OFF	10503-55
$\overline{\text{TAPE TOP}}$	ON	OFF	10503-47
$\overline{\text{TAPE END}}$	ON	OFF	10503-46
CASS.COM. UP	※3		10503-64
CASS.COM. DOWN			10503-63
LOADING	※4		10503-68
UNLOADING			10503-67
CONTROL R	※5		10503-65
CONTROL L			10503-66
$\overline{\text{START}}$	ON	OFF	10503-19
$\overline{\text{HOLD}}$	ON	OFF	10503-20
REEL $\overline{\text{FWD}}$/RVS	FWD	RVS	Q504,505
$\overline{\text{REEL BRAKE}}$	ON	OFF	IC503-77
CAPSTAN SPEED	——		IC503-10thru.6
$\overline{\text{CUE}}$	CUE	STOP	IC503-5

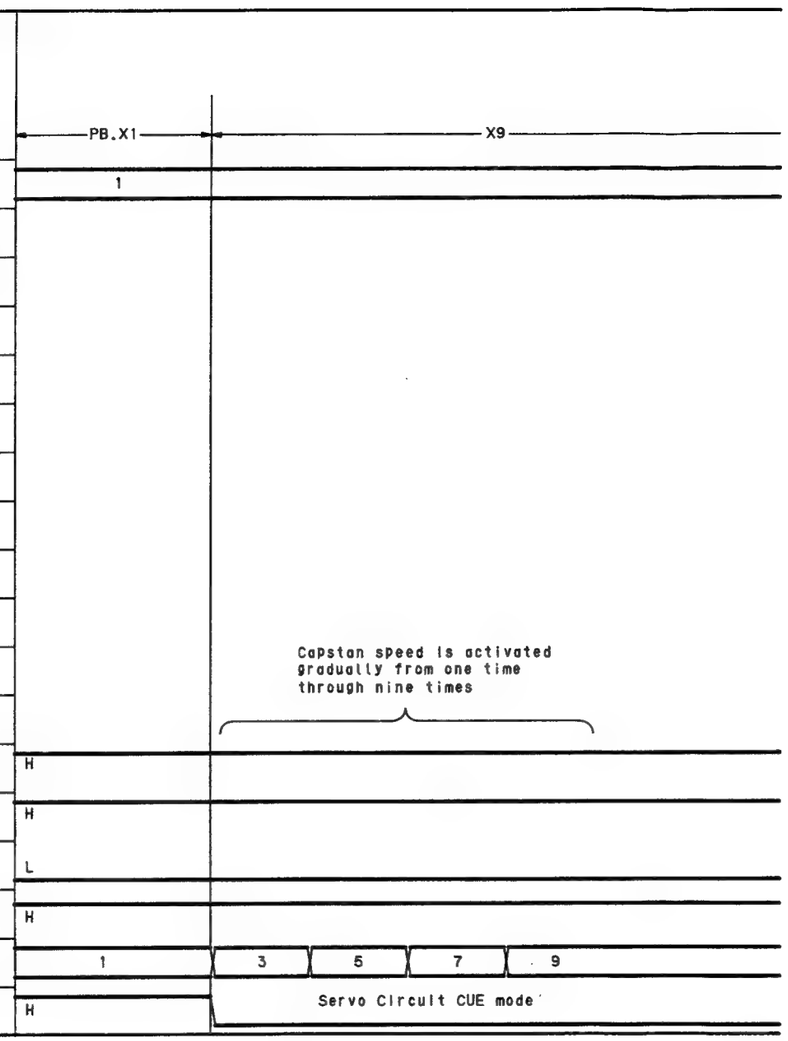


NOTE: CASS.COM. means Cassette Compartment.

2-56

6. PB, X1 → X9

SIGNAL	L	H	MEASURING POINT SST-2 BOARD (PIN NO)
MODE SW A,B,C	※1		IC503-59,58,57
LOADING SW A,B,C	※2		IC503-62,61,60
CASSETTE IN	ON	OFF	IC503-56
CASSETTE DOWN	ON	OFF	IC503-55
$\overline{\text{TAPE TOP}}$	ON	OFF	IC503-47
$\overline{\text{TAPE END}}$	ON	OFF	IC503-46
CASS.COM. UP	※3		IC503-64
CASS.COM. DOWN			IC503-63
LOADING	※4		IC503-68
UNLOADING			IC503-67
CONTROL R	※5		IC503-65
CONTROL L			IC503-66
START	ON	OFF	IC503-19
HOLD	ON	OFF	IC503-20
REEL $\overline{\text{FWD}}$/RVS	FWD	RVS	Q504,505
$\overline{\text{REEL BRAKE}}$	ON	OFF	IC503-77
CAPSTAN SPEED	——		IC503-10thru.6
$\overline{\text{CUE}}$	CUE	STOP	IC503-5

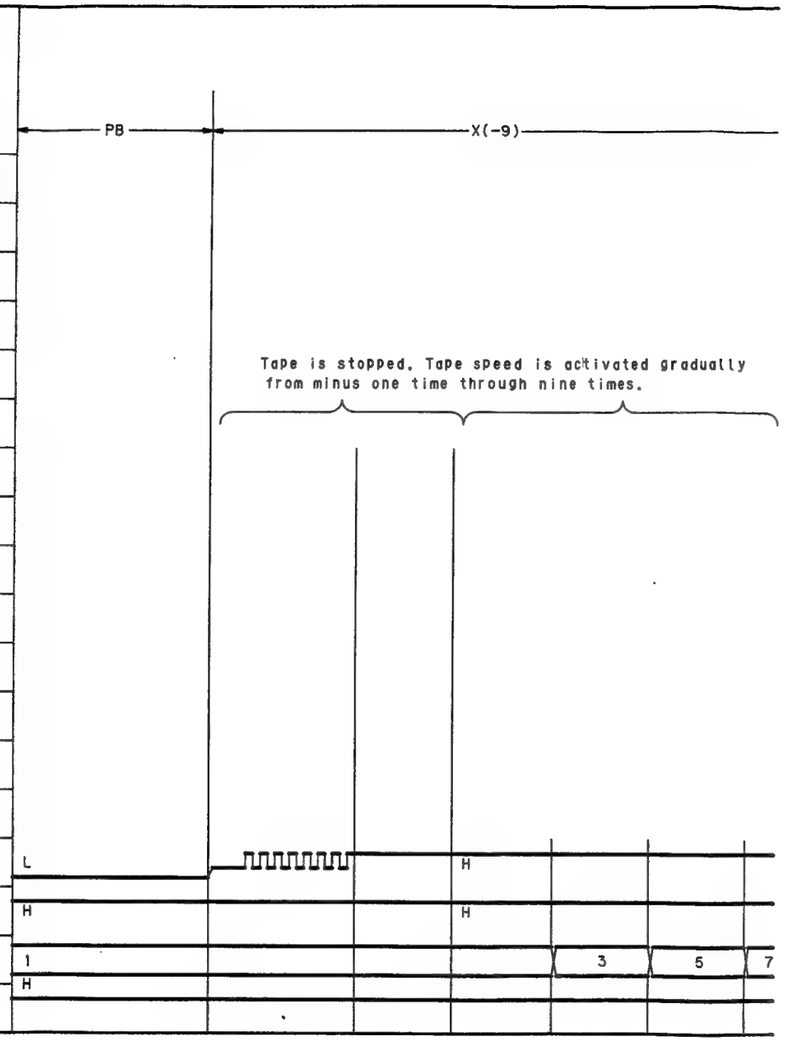


NOTE: CASS.COM. means Cassette Compartment.

2-57

7. PB → X(-9)

SIGNAL	L	H	MEASURING POINT SST-2 BOARD (PIN NO.)
MODE SW A,B,C	※1		IC503-59,58,57
LOADING SW A,B,C	※2		IC503-62,61,60
CASSETTE IN	ON	OFF	IC503-56
CASSETTE DOWN	ON	OFF	IC503-55
$\overline{\text{TAPE TOP}}$	ON	OFF	IC503-47
$\overline{\text{TAPE END}}$	ON	OFF	IC503-46
CASS.COM. UP	※3		IC503-64
CASS.COM. DOWN			IC503-63
LOADING	※4		IC503-68
UNLOADING			IC503-67
CONTROL R	※5		IC503-65
CONTROL L			IC503-66
START	ON	OFF	IC503-19
HOLD	ON	OFF	IC503-20
REEL $\overline{\text{FWD}}$/RVS	FWD	RVS	Q504,505
$\overline{\text{REEL BRAKE}}$	ON	OFF	IC503-77
CAPSTAN SPEED	——		IC503-10to6
$\overline{\text{CUE}}$	CUE	STOP	IC503-5

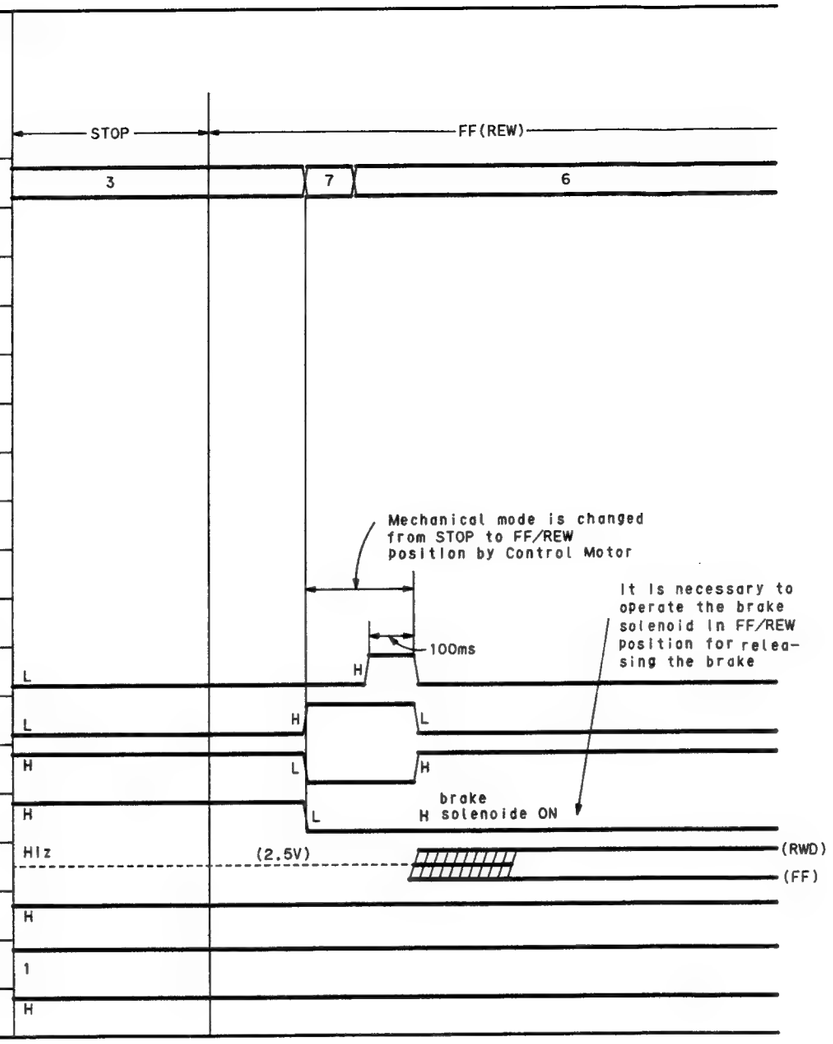


NOTE: CASS.COM. means Cassette Compartment.

2-58

8. STOP → FF(REW)

SIGNAL	L	H	MEASURING POINT SST-2 BOARD (PIN NO.)
MODE SW A,B,C	※1		IC503-59,58,57
LOADING SW A,B,C	※2		IC503-62,61,60
CASSETTE IN	ON	OFF	IC503-56
CASSETTE DOWN	ON	OFF	IC503-55
$\overline{\text{TAPE TOP}}$	ON	OFF	IC503-47
$\overline{\text{TAPE END}}$	ON	OFF	IC503-46
CASS.COM. UP	※3		IC503-64
CASS.COM. DOWN			IC503-63
LOADING	※4		IC503-68
UNLOADING			IC503-67
CONTROL R	※5		IC503-65
CONTROL L			IC503-66
START	ON	OFF	IC503-19
HOLD	ON	OFF	IC503-20
REEL $\overline{\text{FWD}}$/RVS	FWD	RVS	Q504,505
REEL BRAKE	ON	OFF	IC503-77
CAPSTAN SPEED	——		IC503-10thru.6
$\overline{\text{CUE}}$	CUE	REV	IC503-5



NOTE: CASS.COM. means Cassette Compartment.

2-59

9. PB → STILL

SIGNAL	MEASURING POINT SST-2 BOARD (PIN NO.)	PB	STILL
CAP FWD/$\overline{\text{RVS}}$	IC405-81	L	
CAP ON	——	ON	Hiz
REEL FWD/RVS	Q504,505		
RVS TENSION ON	IC405-79	L	

10. FWD SLOW

SIGNAL	MEASURING POINT SST-2 BOARD (PIN NO.)	FWD SLOW
CAP FWD/$\overline{\text{RVS}}$	IC405-81	L
CAP ON	——	ON
REEL FWD/$\overline{\text{RVS}}$	Q504,505	L
RVS TENSION ON	IC405-79	L

11. X (−1)→ STILL

SIGNAL	MEASURING POINT SST-2 BOARD (PIN NO.)	X(−1)	STILL
CAP FWD/$\overline{\text{RVS}}$	IC405-81	H	
CAP ON	——	ON	
REEL FWD/$\overline{\text{RVS}}$	Q504,505	H	
RVS TENSION ON	IC405-79	H	

12. RVS SLOW

SIGNAL	MEASURING POINT SST-2 BOARD (PIN NO.)	RVS SLOW
CAP FWD/$\overline{\text{RVS}}$	IC405-81	H
CAP ON	——	ON
REEL FWD/$\overline{\text{RVS}}$	Q504,505	H
RVS TENSION ON	IC405-79	H

13. X(1)→ X1

SIGNAL	MEASURING POINT SST-2 BOARD (PIN NO.)	STILL	REEL DRIVE MODE CHANGE	RVS
CAP FWD/$\overline{\text{RVS}}$	IC405-81	L		H
CAP ON	——	ON		
REEL FWD/$\overline{\text{RVS}}$	Q504,505	L		
TENSION DET IN	IC503-23	L	H	
REEL BLAKE	IC503-77	H	L	H
RVS TENSION ON	IC405-79	L		H

SECTION 3
PERIODIC CHECK AND MAINTENANCE

It is recommended that you carry out the following periodic check and maintenance in order to obtain maintain performance and ensure a long life for the unit and tape.

3-1. MAINTENANCE AFTER REPAIR

Carry out the following maintenance after repair without regard to the operating hours of the unit.

(1) Cleaning Rotary Upper Drum
- Press a wiping cloth moistend with cleaning fluid lightly against Rotary Upper Drum and turn the Rotary Upper Drum slowly counterclockwise by hand.

  Note: Never turn the Drum by motor with POWER ON state and never turn it clockwise by hand. When cleaning the head chip, never move the wiping cloth in vertical direction. The head chip will be damaged.

(2) Cleaning Tape Running System (Fig. 3-1-1)
- Put the Cassette Compartment Assembly into the EJECT mode. Clean tape running system such as No.1 through No.11 Guides, Capstan Shaft, Pinch Roller and IP Roller Guide using the wiping cloth moistend with the clearning fluid. After cleaning, be sure to wipe the cleaned surface two to three times with a dry cloth.

(3) Cleaning Drive System
- Clean drive system such as Reel Table surface, Belt and Timing Belt of the Cassette Compartment Assembly using the cleaning piece moistend with cleaning fluid.

3-2. PERIODIC CHECK

Carry out periodic check and maintenance according to operational hours of the unit.

3-3. HOURS METER

The Time Counter on the Front Panel can display the total rotation time of the Upper Drum Assembly and operation time at POWER ON state. How to set Time Counter Display into the Hours Meter Mode, refers to Section 2-20. The Hours Meter Mode has two display modes as follows.

- MENU No.205: HOURS METER (DRUM)
  Total rotation time of the Upper Drum Assembly.
- MENU NO.206: HOURS METER
  Total operation time at POWER ON state.

The periodic checks and maintenance use MENU No. 205. Refer to periodic maintenance table.

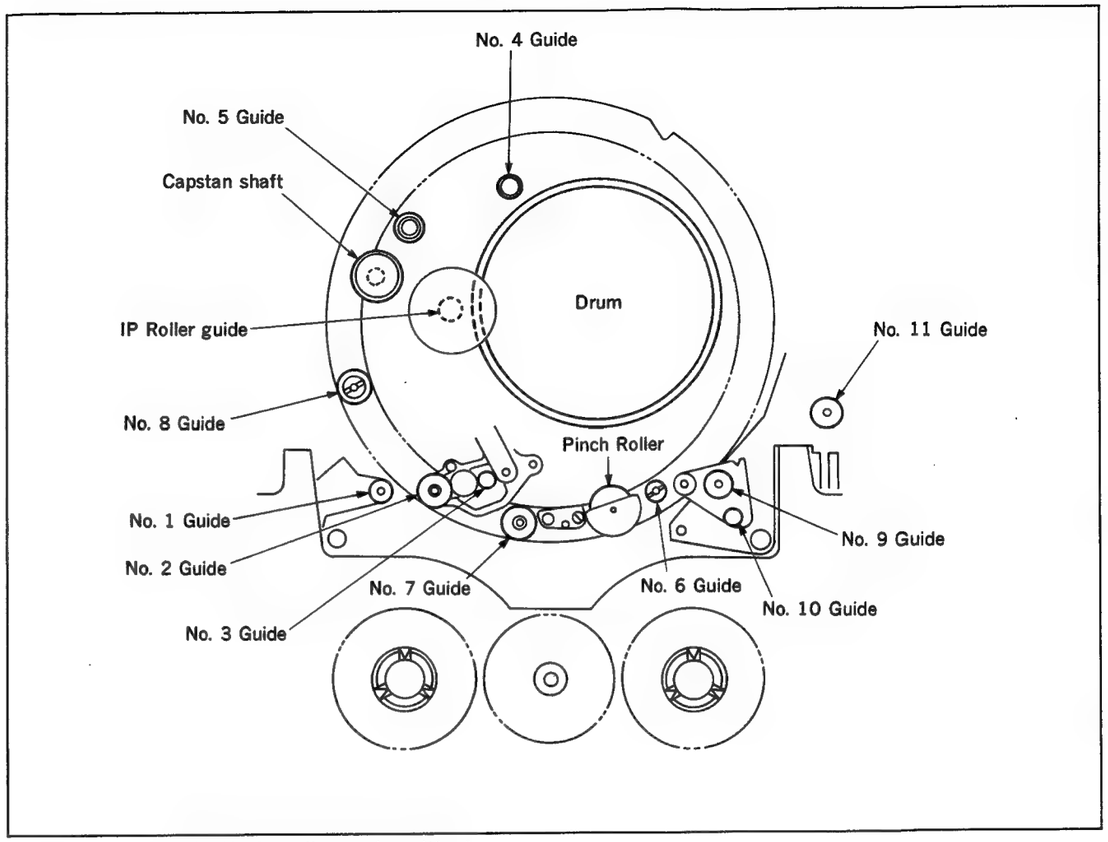


Fig. 3-1-1 Tape Path (Unthreading-end position)

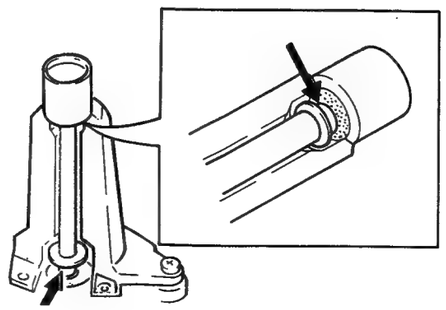
3-1

PERIODIC MAINTENANCE TABLE

○ : Cleaning ☆ : Replacement △ : Checking □ : Oiling

	Item		Operation hours using MENU No. 205 (Drum rotation)										
	Description	Parts No.	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	
Tape Path	Tape Path surface	————	○	○	○	○	○	○	○	○	○	○	Refer to Fig. 3-1-1
	Upper Drum Ass'y (DGR-97-R)	A-8260-396-A	○	☆	○	☆	○	–	○	☆	○	☆	Cleaning: Refer to Section 3-1. Replacement: Refer to Section 4-2.
	Drum Ass'y (DGH-97A-R)	A-8260-395-A	○	○	○	○	○	☆	○	○	○	○	Cleaning: Refer to Section 3-1. Replacement: Refer to Section 4-3.
	Pinch Roller Arm Ass'y	X-3686-576-1	○	☆	○	☆	○	☆	○	☆	○	☆	Cleaning: Refer to Section 3-1. Replacement: Refer to Section 4-6.
	Capstan shaft bearing	8-835-364-01	–	□	–	□	–	□	–	□	–	□	Refer to Note 4.
Drive System	L-motor belt	3-686-546-01	△	☆	△	☆	△	☆	△	☆	△	☆	Checking: Visually check the something is wrong.
	Brake solenoid	1-454-377-21	–	–	○	–	–	☆	–	–	○	–	Cleaning: Iron core with a dry cleaning piece. Replacement: Refer to Section 4-22.
	Cleaning solenoid	1-454-445-21	–	–	○	–	–	☆	–	–	○	–	Cleaning: Iron core with a dry cleaning piece. Replacement: Refer to Section 4-5-3.
	M-switch Ass'y	A-7040-159-A	–	–	–	–	–	☆	–	–	–	–	Replacement: Refer to Section 4-23.
	Reel motor (DC motor U-11B)	8-835-304-11	–	–	–	–	–	☆	–	–	–	–	Replacement: Refer to Section 4-9.
	T Reel Table Ass'y	X-3711-998-1	–	–	–	–	–	☆	–	–	–	–	Replacement: Refer to Section 4-15.
	S Reel Table Ass'y	X-3713-427-1	–	–	–	–	–	☆	–	–	–	–	Replacement: Refer to Section 4-14.
	T Main Brake Ass'y	X-3686-574-5	–	–	–	☆	–	–	–	☆	–	–	Replacement: Refer to Exploded Views.
	S Main Brake Ass'y	X-3713-429-1	–	–	–	☆	–	–	–	☆	–	–	Replacement: Refer to Exploded Views.
	CR Roller Ass'y	X-3166-813-1		☆		☆		☆		☆		☆	Replacement: Refer to Section 4-5-2.
	T Soft Brake Ass'y	X-3711-987-2	–	–	–	☆	–	–	–	☆	–	–	Replacement: Refer to Exploded Views.
	REW Brake Ass'y	X-3711-993-1	–	–	–	☆	–	–	–	☆	–	–	Replacement: Refer to Exploded Views.
	Tension Regulator Band Ass'y	X-3686-531-1	–	–	–	☆	–	–	–	☆	–	–	Replacement: Refer to Section 4-18.
	Roller (Cassette-up Compairtment)	3-713-466-01	○	○	○	○	○	○	○	○	○	○	Cleaning: Clean with a cleaning picee moistened with cleaning fluid.
	S Tension Sensor Ass'y	A-8262-577-A	△	△	△	△	△	△	△	△	△	△	Make sure that the smoothly turned right and left direction by hands.
Performance Check	Abnormal-noise	————	△	△	△	△	△	△	△	△	△	△	
	FWD Back tension measurement	————	–	△	–	△	–	△	–	△	–	△	Checking: Refer to Section 5-5.
	Brake torque measurement	————	–	△	–	△	–	△	–	△	–	△	Checking: Refer to Sections 5-1,2,3.
	FWD, RVS torque measurement	————	–	△	–	△	–	△	–	△	–	△	Checking: Refer to Section 5-4.

Note 1: When overhauling the unit, refer to the items above for replacement of parts.
Note 2: The time of parts replacement will differ from operating environment.
Note 3: Be sure to clean the tape path surface in repairing.
Note 4: Oiling to the Capstan Shaft Bearing:
Remove the Capstan Motor from the Mechanical Deck and apply one-half drop of oil to the Capstan Shaft Bearing. (Any Grease that adheres to other surrounding parts must be removed with gauze or soft cloth.)



3-2

3-4. HOW TO USE THE CLEANING TAPE

Cleaning Tape:
V8-25CLH (optional accessory)
Note : Never use the cleaning tape, V8-25CLN.

(1) If the Rotary Head clogs and the head clogging can not be removed by means of cleaning the head, use the cleaning tape. Using the cleaning tape for any other reason will be shorten the life of the head.

(2) Use the cleaning tape for no longer than 15 seconds and never rewind after use. The cleaning tape can only be used once.

3-5. OTHERS

(1) Sony oil
- Be sure to use Sony oil. If any other oil is used, it is possible to cause trouble because it may not have the correct viscosity.

  Sony oil: Part No. 7-661-018-18

- Use only clean Sony oil. If the oil is contaminated with dust or other particles, it is possible to cause bearings to seize or wear excessively.
- One drop of oil means the amount which sticks to a 2 mm diameter rod, as shown in Fig.3-5-1.

(2) Sony grease (Fig.3-5-2)
- Be sure to use the Sony grease as the lubrication grease.
  Sony grease (SGL-501): Part No. 7-662-001-62

(3) Molytone Grease
- Be sure to use MOLYTONE GREASE.
  Molytone grease (No.320): Part No. 7-662-001-41

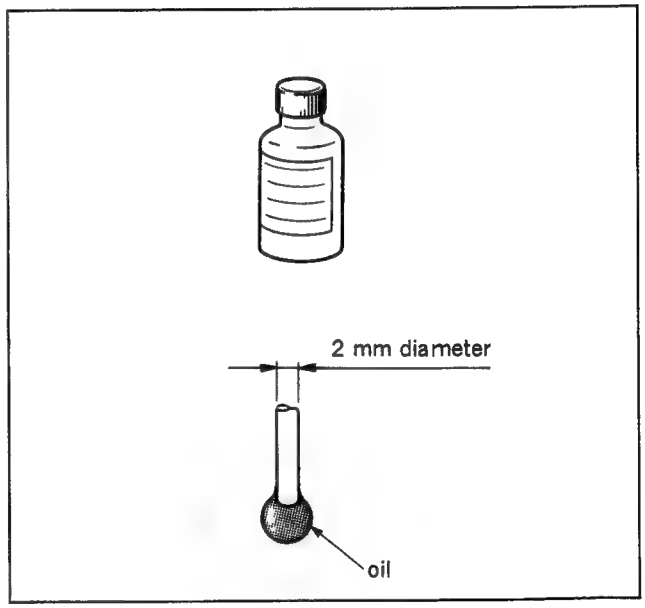


Fig. 3-5-1 Sony Oil

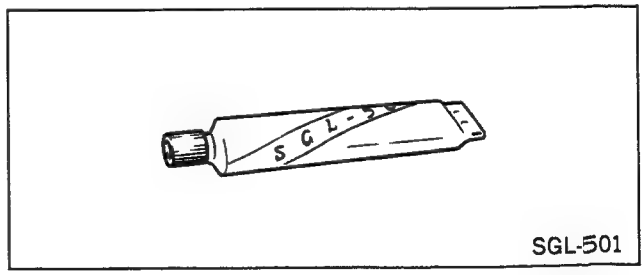


Fig. 3-5-2 Sony Grease

SECTION 4
REPLACEMENT OF MAJOR PARTS

Basic Information For Parts Replacement

A. In some following steps, the mode selector (tool) is used to replace parts. Modes marked [ ] in the replacement procedures are established by pressing a button on the mode selector tool.
(Mode selector tool : J-6080-825-A)

Operation of mode selector tool

1. Name of Mode Selector tool parts
See Fig. 4-1 Name of mode selector tool parts.

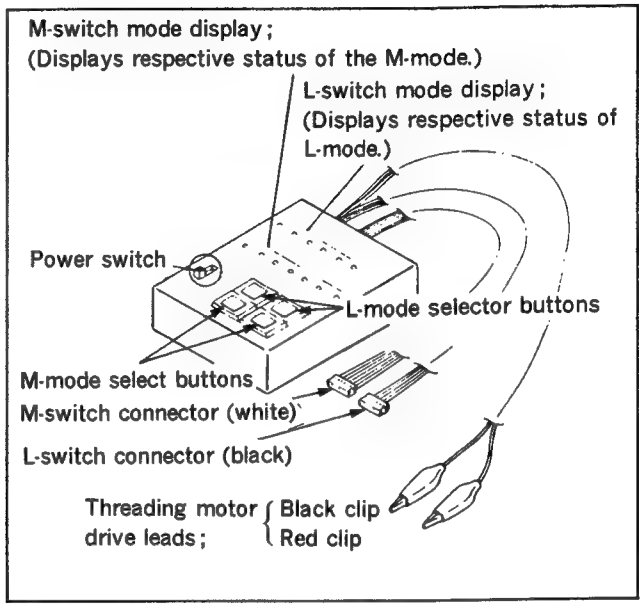


Fig. 4-1 Name of mode selector tool parts

2. Connection (Fig. 4-2)
1) Remove the top panel following the procedures of Section 2-5.
2) Remove the mechanical deck from the unit following the procedures of Section 2-6.
3) Disconnect the 6P connectors from the MS-36 and LM-22 boards in the mechanical deck.
4) Connect the 6P connector (6-wire harness, white) of the mode selector M switch, to the MS-36 board.
5) Connect the 6P connector (4-wire harness, black) of the L switch, to the LM-22 board.
6) Remove the threading motor cover.
7) Connect the red clip of the mode selector to the red terminal of the threading motor, and the black clip of the mode selector to the brown terminal of the threading motor.

3. Caution
1) Whenever L switch is going to be operated, be sure that the M switch is set to the LOADING/UNLOADING mode position.
2) Whenever M switch is going to be operated, be sure that the L switch is set to the LOADING TOP or the LOADING END mode position.

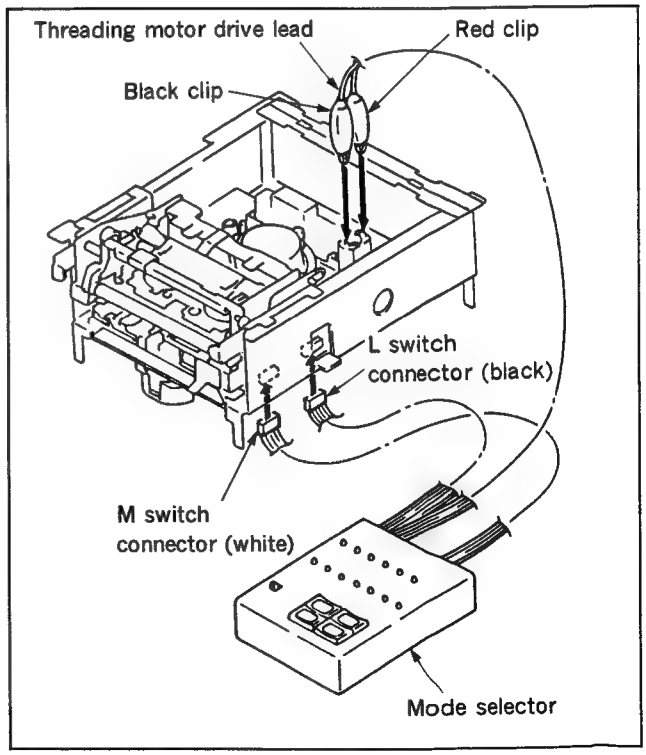


Fig. 4-2 Connection of mode selector

4. Operation (Fig. 4-3)

When the selector is not in any mode during mode selection, BLANK will light ON, in both L mode and M mode.

1) L mode

- When right side switch of the L mode selector buttons is kept pressed, the mode will advance sequentially from LOADING TOP to LOADING END in right direction.
- When mode is desired to advance from LOADING END toward LOADING TOP, keep pressing the left side switch of the L mode selector buttons.
- When SLOW position of the POWER switch is selected, the loading ring moves slowly than NORMAL position.

2) M mode

- When EJECT is desired set L switch in the LOADING TOP Position.
- When FWD is desired from FF/REW mode, or when FF/REW is desired from FWD mode, set the L switch in the LOADING END position.
- When the right switch of the M mode selector buttons is kept pressed, mode will advance sequentially from EJECT to FWD in right direction.

  In order to advance the mode sequentially from FWD to EJECT, keep pressing the left switch of the M mode selector buttons.

Note : This mechanical deck does not have RVS position, so it will not go into RVS mode.

B.In respective parts replacement section of this manual, necessity of mechanical deck removal/installation, cassette cmpartment ass'y removal/instalation are described, but are omitted from actual procedures. Please perform them as needed.

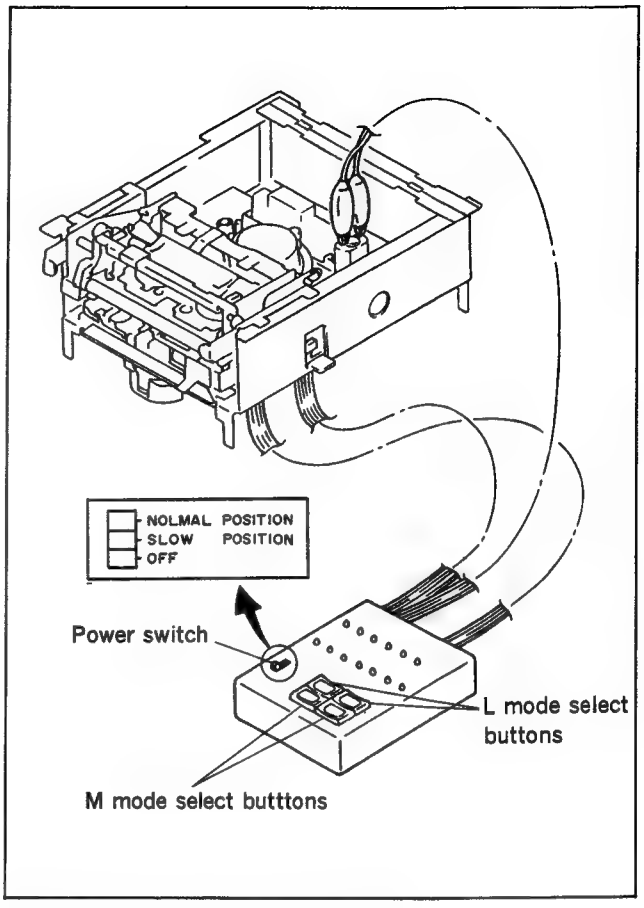
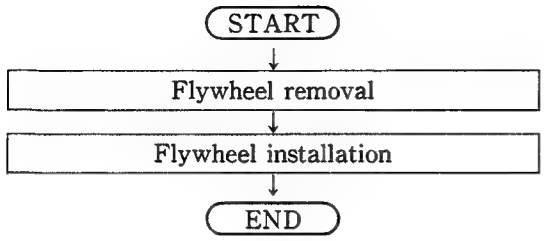


Fig. 4-3 Operation of mode selector

4-1. FLYWHEEL REPLACEMENT

Replacement flow chart



Replacement

1. Flywheel removal
   While pinching the claws of the IP roller guide, remove the flywheel.

2. Flywheel installation
   Install a new flywheel. Holding it with its larger hole facing downward, push it into the IP roller guide untill it clicks into place.

Note: Take care not to bend the guide shaft.

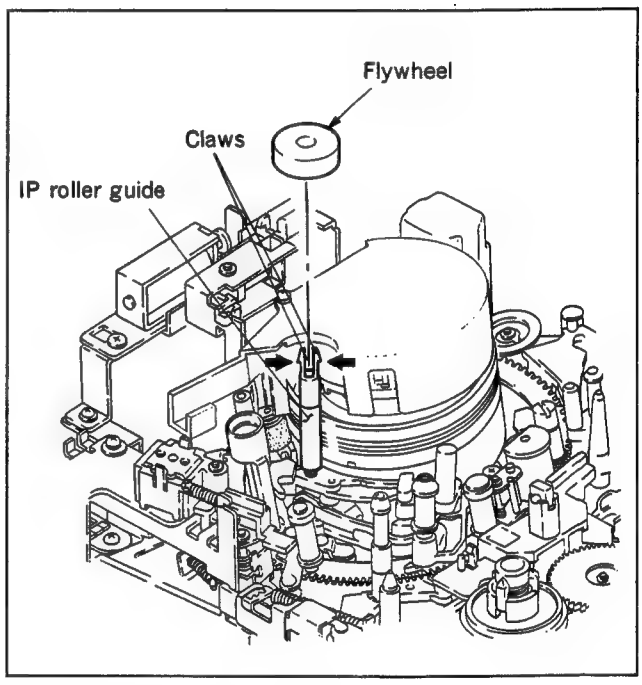


Fig. 4-1-1 Flywheel removal

4-2. REPLACEMENT OF ROTARY UPPER DRUM

Basic Knowledge

A The rotary upper drum ass'y is the periodic maintenance replacement part.
- Replace the rotary upper drum ass'y referring to the maintenance and inspection sheet.
- Individual video head cannot be replaced separately. Replace the entire rotary upper drum ass'y.

B Prepare the followings.
- Rotary drum tool :
  Sony part No. J-6257-460-A
- Cleaning fluid :
  Sony part No. Y-2031-001-1 (or equivalent)
- Wiping cloth :
  Sony part No. 7-741-900-53

C Replacement flow chart

START
↓
Flywheel removal
↓
Cleaning roller ass'y removal
↓
Drum cover removal
↓
Rotary transformer (stator) removal
↓
Rotary transformer (rotor) removal
↓
Rotary upper drum removal
↓
New rotary upper drum installation
↓
Rotary transformer (rotor) installation
↓
Rotary transformer (stator) installation
↓
Drum cover installation
↓
Cleaning roller ass'y installation
↓
Flywheel installation
↓
Drum cleaning
↓
Tape transport adjustment
↓
Switching pulse adjustment
↓
PB RF level adjustment/
PCM RF level adjustment
↓
PB RF frequency response adjustment (Hi8)/PB RF frequency response adjustment (NORMAL)
↓
Flying erase adjustment/
Recording current adjustment
↓
Picture spritting compensation adjustment
↓
END

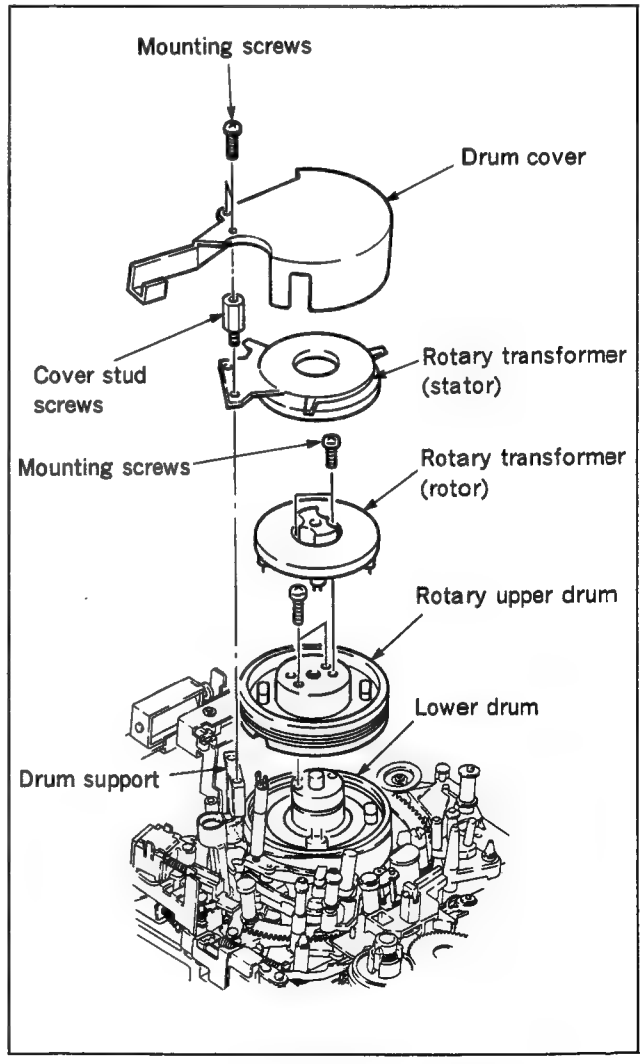


Fig. 4-2-1 Replacement of rotary upper

Replacement Procedure

1. Flywheel removal
   Remove the flywheel referring to Section 4-1.

2. Cleaning roller ass'y removal
   Remove the cleaning roller ass'y referring to Section 4-5.

3. Drum cover removal (Fig. 4-2-2)
   1) Remove the two screws securing the drum cover, then remove the drum cover.

4. Rotary transformer (stator) removal (Fig. 4-2-2)
   1) Remove the two cover retaining screws securing the rotary transformer (stator) to the drum support, then remove the rotary transformer.
   2) The harness from the board (DL-2) on the rotary transformer is connected to the VRA-4 board via 9-pin connector. Remain the 9-pin connector connected. Place rotary transformer aside taking care not to damage it or do not allow dirt to get on it.

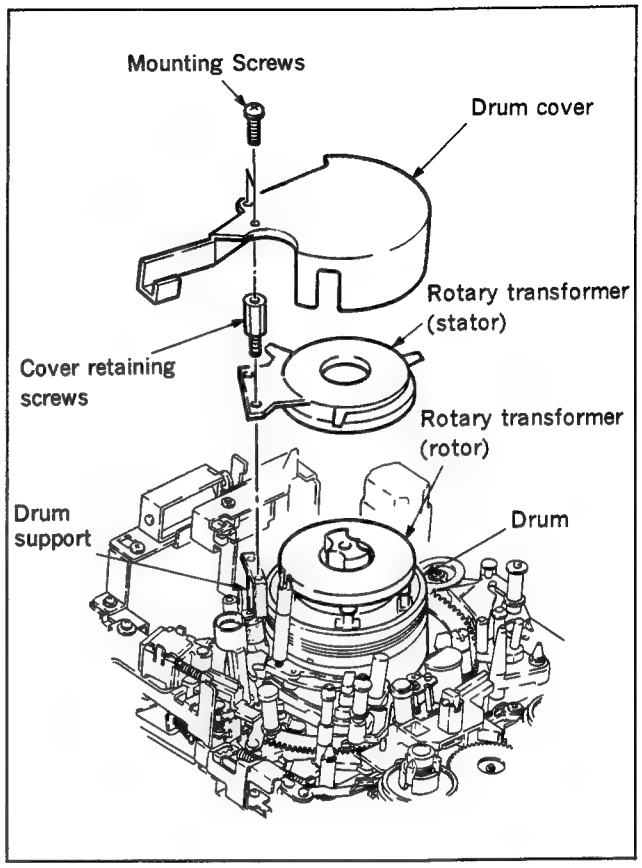


Fig. 4-2-2 Drum cover and the rotary transformer (stator)

5. Rotary transformer (rotor) removal (Fig. 4-2-3)
   1) Remove the two screws securing the rotary transformer (rotor) to the upper drum.

   2) Pull the rotary transformer strainght upward from the upper drum without swaying it left or right. Remove it.

Caution : 1) Locate the two terminals protruding from three points in the rear of the rotary transformer (rotor) take care not to bend these terminals.

Caution : 2) Use the securing screws removed in step (1) to install the rotary drum tool when removing the rotary upper drum.

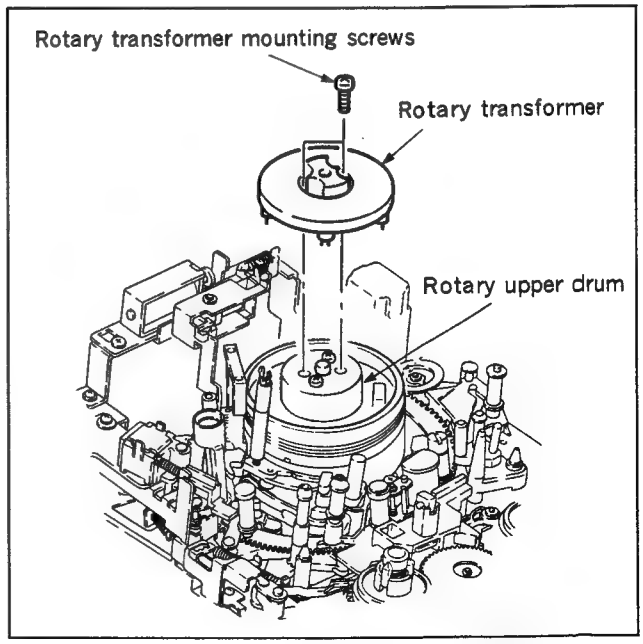


Fig. 4-2-3 Rotary transformer (rotor) removal

6. Rotary upper drum removal (Fig. 4-2-4)
   1) Remove the two screws shown in Fig. a.
   2) Align the holes of the rotary drum tool with the corresponding holes of the rotary transformer (rotor) of the upper drum.
   3) Using the rotary transformer mounting screws that are removed in step 4-(1), install the rotary drum tool on the upper drum. (See Fig. b).
   4) Rotate the tool screw with hand in the clockwise direction (A direction), and lift up the upper drum from the lower drum, then remove the upper drum.

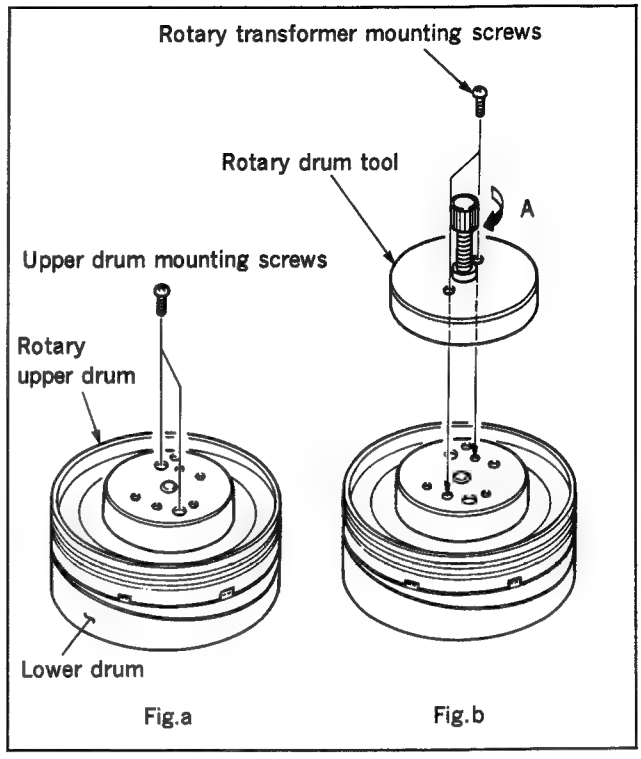


Fig. 4-2-4 Rotary upper drum removal

7. Replacement/removal of the rotary upper drum
   1) Remove the rotary drum tool from the rotary upper drum by removing the screws that was secured in step 6-3.
   2) Install the paralle pin perpendicularly into the upper drum positioning hole of the lower drum flange.
   3) Install a new rotary upper drum on the lower drum, ensuring that the parellel pin goes through the positioning hole of the rotary upper drum as shown. (see Fig. c)
   4) Press the rotary upper drum flange downward with the fingers untill the flange of the lower drum closely fits the inner face of the rotary upper drum.
   5) Tighten the two mounting screws of the rotary upper drum, and remove the parallel pin. (see Fig. d)

Note: Check to see that no dust or foreign materials on contacting surfaces of rotary upper drum and lower drum.

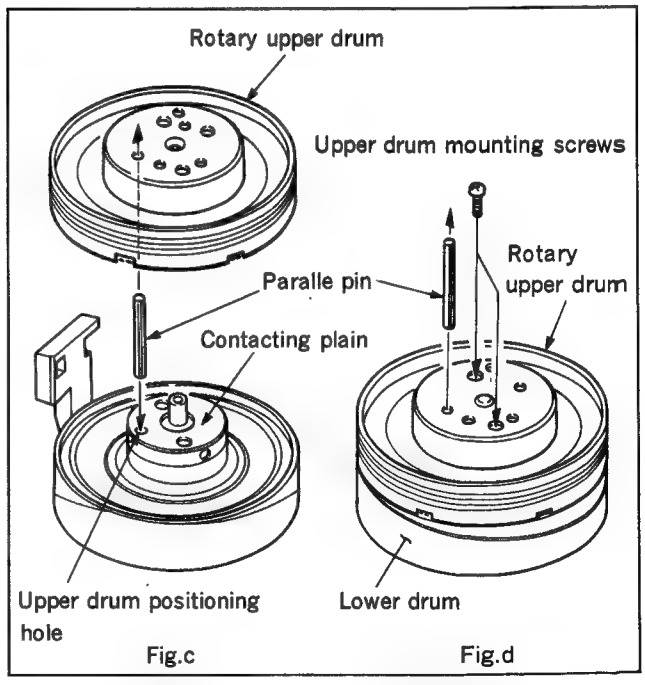


Fig. 4-2-5 Rotary upper drum installation

8. Install the rotary transfomer (rotor).

9. Rotary transfomer (stator) installation
   Adjust the position of the rotary transformer so that gap between rotor's flange outer circumference and stator's inner circumference is equal

10. Drum cover installation
    Install the drum cover by reversing step 3.

Note: Arrange the harness of the rotary transformer so that never touch it with the CR arm of the cleaning roller ass'y.

11. Cleaning roller ass'y installation
    Install the cleaning roller ass'y referring to Section 4-5, and check the pressure.

12. Flywheel installation
    Install the flywheel referring to Section 4-1.

13. Drum cleaning
    Clean the drum referring to steps 1) of section 3-1. Take care not to break the head chips during cleaning.

14. Tape transport adjustment
    Perform tape transport adjustment referring to Section 6.

15. Switching position adjustment
    Perform this adjustment referring to Section 6-10-4.

16. PB RF level adjustment/PCM RF level adjustment
    Perform these adjustments referring to Section 10-1/10-2.

17. PB RF frequency response adjustment (Hi8)/
    PB RF frequency response adjustment (NORMAL)
    Perform these adjustments referring to Section 10-3/10-4.

18. Flying erase adjustment/Recording current adjustment
    Perform these adjustments referring to Section 10-57/10-58.

19. Picture spritting compensation adjustment
    Perform this adjustment referring to Section 8-6.

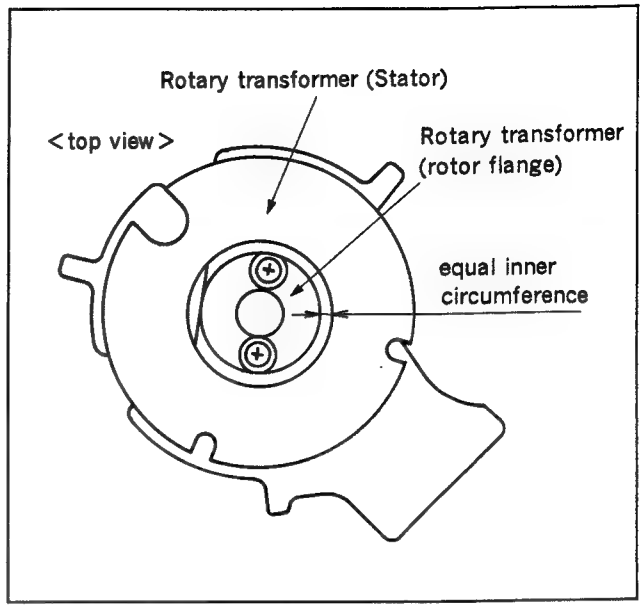


Fig. 4-2-6 Rotary transformer installation

4-3. DRUM ASS'Y REPLACEMENT

Basic Knowledge

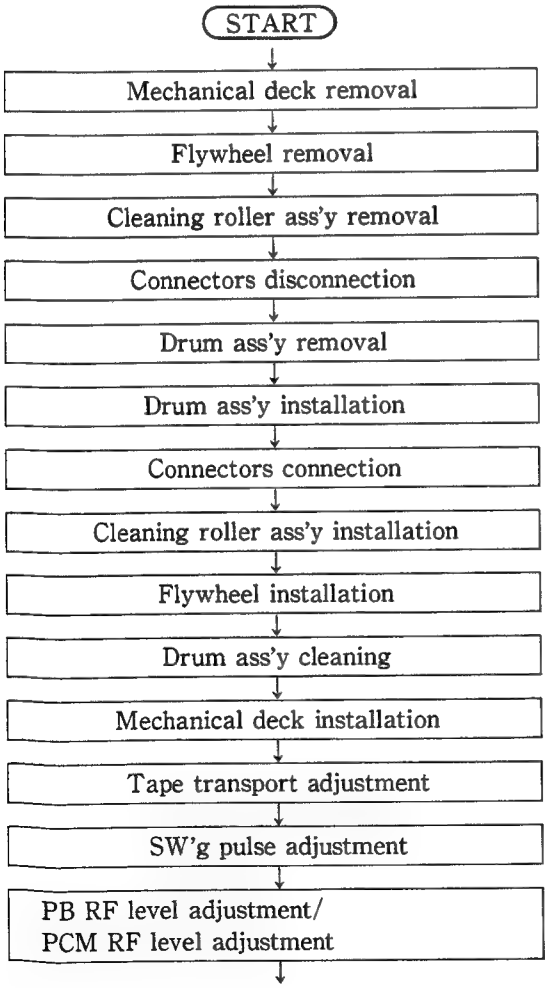
A 1)Before replacing the drum ass'y, remove first the mechanical deck from the unit.

2)When replacing the drum ass'y, take care so as not to damage the IP roller guide and the No. 4 guide located near the drum ass'y.

B Prepare the followings for replacement of the drum ass'y.

- Cleaning fluid:
  Sony part No. Y-2031-001-1
- Wiping cloth:
  Sony part No. 7-741-900-53

C Replacement flow chart



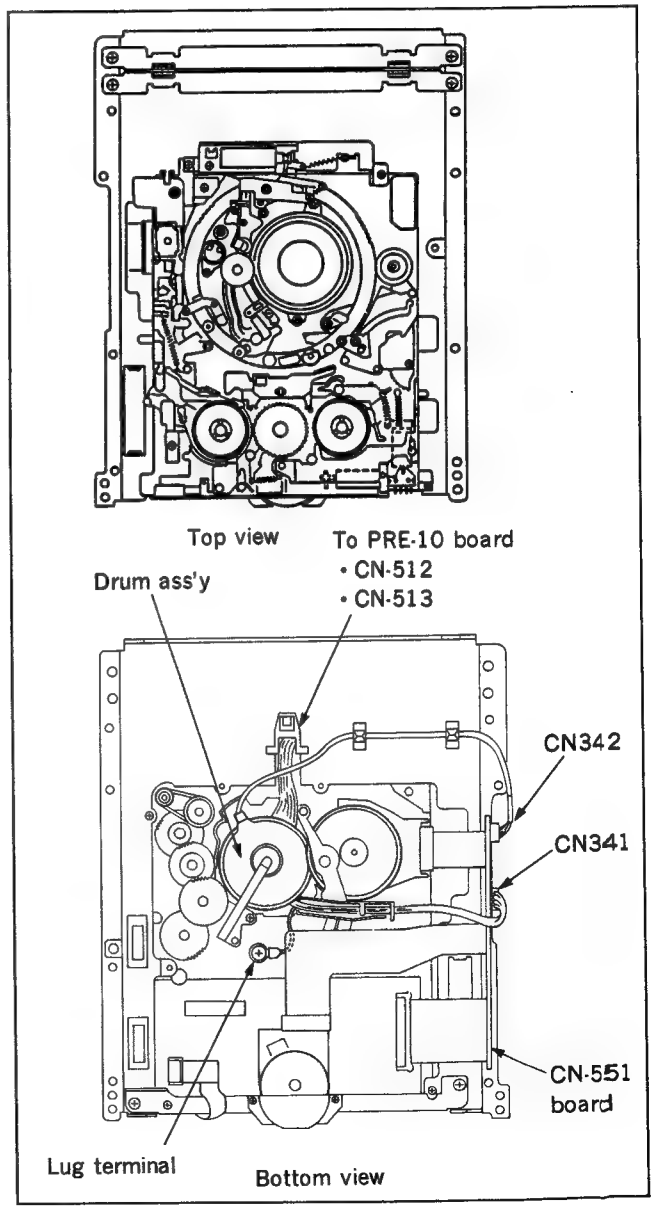


Fig. 4-3-1 Disconnect the drum ass'y connector

Replacement Procedure

1. Mechanical deck removal
   Remove the mechanical deck referring to Section 2-6.
2. Flywheel removal
   Remove the flywheel referring to Section 4-1.
3. Cleaning roller ass'y removal
   Remove the cleaning roller referring to Section 4-5.
4. Disconnect the connectors (Fig. 4-3-1)
   1) Remove the harness clamper coming out from the drum ass'y.
   2) Disconnect the connectors (five) of the drum ass'y, that are connected to boards VRA-4, PRE-10 and CN551.
   3) Remove the screw securing lug plate on bottom of mechanical chassis.
5. Drum ass'y removal (Fig. 4-3-2)
   Remove the two screws securing the drum ass'y, then remove the drum ass'y upward.

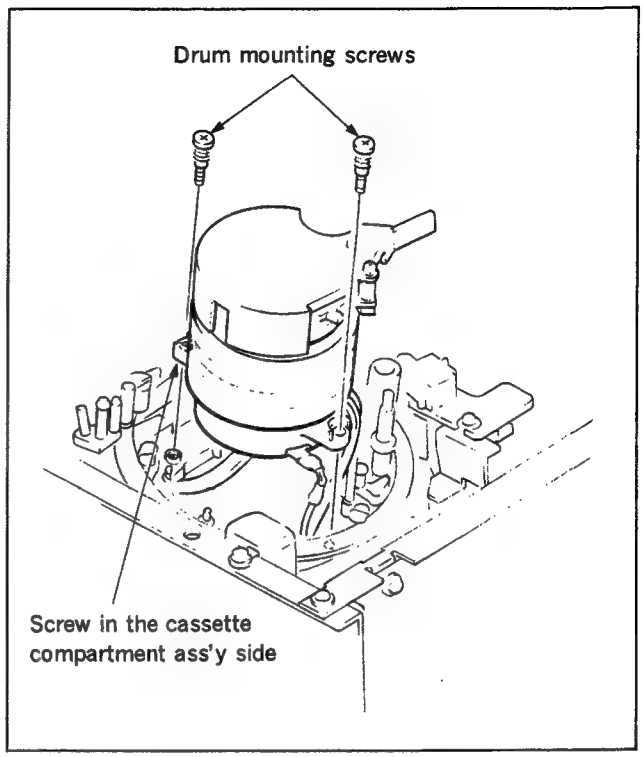


Fig. 4-3-2 Drum ass'y removal

6. Drum ass'y installation
   1) Clean the mounting surface of the mechanical chassis and the mounting face of the replacement drum ass'y with a wiping cloth moistened with cleaning fluid. Confirm that there is no dirt or scratches on the both faces.
   2) Insert the three harnesses coming out of the bottom of the drum ass'y, through the opening hole of the mechanical deck.
   3) Align the drum ass'y with mechanical chassis using two pins of the chassis. Secure the drum ass'y to the mechanical chassis using t he two mounting screws.

Note: When securing the drum ass'y to the mechanical chassis, rotate the rotary drum to the position where the rotary heads are for from the screwing position so as not to damage the rotary head with screwdriver while tightening the screw.

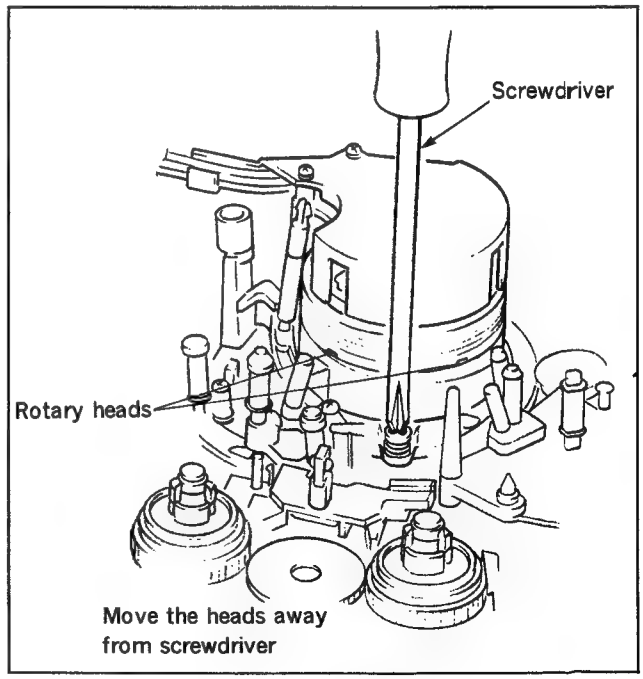


Fig. 4-3-3 Drum ass'y installation

7. Installation of Drum Cover and connectors
   1) Remove the Drum cover from old Drum, and install it to new Drum.

   2) Connect the five connectors that were disconnected in steps 3, to the respective boards.

   3) Fix harness with clamper.

   4) Install the lug plate on mechanical chassis with screw.

Note: Arrange the harness of the rotary transformer (stator) so that never touch it with the CR arm of the cleaning roller ass'y.

8. Flywheel installation
   Install the flywheel referring to Section 4-1 Flywheel Replacement.

9. Cleaning roller ass'y installation
   Install the cleaning roller ass'y referring to Section 4-5.

10. Drum ass'y cleaning
    Clean the drum ass'y referring to Section 3-1.

11. Installing the Mechanism deck
    Install the mechanical deck referring to Section 2-6.

12. Tape transport adjustment
    Perform tape transport adjustment referring to Section 6.

13. Switching pulse adjustment
    Perform as per Section 6-10-5.

14. PB RF level adjustment/PCM RF level adjustment
    Perform these adjustments referring to Section 10-1/10-2.

15. PB RF frequency response adjustment (Hi8)/
    PB RF frequency response adjustment (NORMAL)
    Perform these adjustments referring to Section 10-3/10-4.

16. Flying erase adjustment/Recording current adjustment
    Perform these adjustments referring to Section 10-57/10-58.

17. Picture spritting compensation adjustment
    Perform this adjustment referring to Section 8-6.

4-4. LOADING RING ASS'Y REPLACEMENT

Basic Knowledge

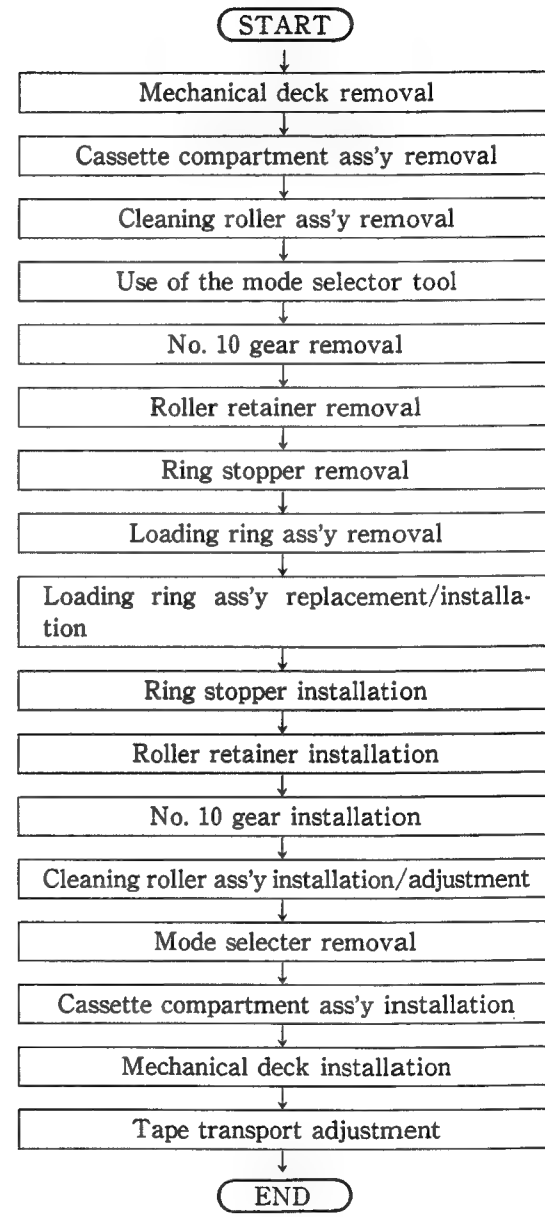
A 1)To replace the loading ring ass'y, remove first the mechanical deck ass'y from the unit. Remove then the cassette compartment ass'y from the mechanical deck.

2) Replacement of loading ring ass'y should be carried out that the drum ass'y is installed in mechanical deck. So, be very careful not to damage the surface of the drum ass'y or of the rotary heads.

B Prepare the followings for replacement work

- Mode selector tool :
  Sony part No. J-6080-825-A
- No. 10 Gear phase adjustment tool :
  Sony part No. J-6257-610-A
- Sony oil :
  Sony part No. 7-661-018-18

C Replacement flow chart



Replacement Procedure

1. Mechanical deck removal
   Remove the mechanical deck referring to Section 2-6.
2. Cassette compartment ass'y removal
   Remove the cassette compartment ass'y referring to Section 2-7.
3. Cleaning roller ass'y removal
   Remove the cleaning roller ass'y referring to Section 4-5.
4. Use of the mode selector
   Press the L mode select button of the mode selector until the guide base ass'y moves to a point just before it locks.
   (Do not push the loading ring ass'y.)
5. No. 10 gear removal (Fig. 4-4-1)
   Remove the washer securing the No. 10 gear remove then the No. 10 gear.
6. Roller retainer removal (Fig. 4-4-1)
   Remove the screw securing the roller retainer remove then the roller retainer and the ring roller.
7. Ring stopper removal (Fig. 4-4-1)
   1) Remove the two screws securing the ring stopper remove then the ring stopper and the ring roller.
   2) Disconnect the connector of drum harness on the VRA-4 board.
8. Loading ring ass'y removal (Fig. 4-4-1)
   Remove the loading ring ass'y in the direction shown by arrow in the figure.
9. The loading ring ass'y replacement/installation
   1) Replace the loading ring ass'y with a new ass'y, then install it in the mechanical deck.
   2) Install the loading ring ass'y in the position of unthread-end (i. e. the pinch roller arm ass'y is in the reel table side).
10. Ring stopper installation
    Install the ring roller and the ring stopper. Secure them with the two screws. (Confirm that the No. 8 guide ass'y is in the reel table side rather than the ring stopper side.)

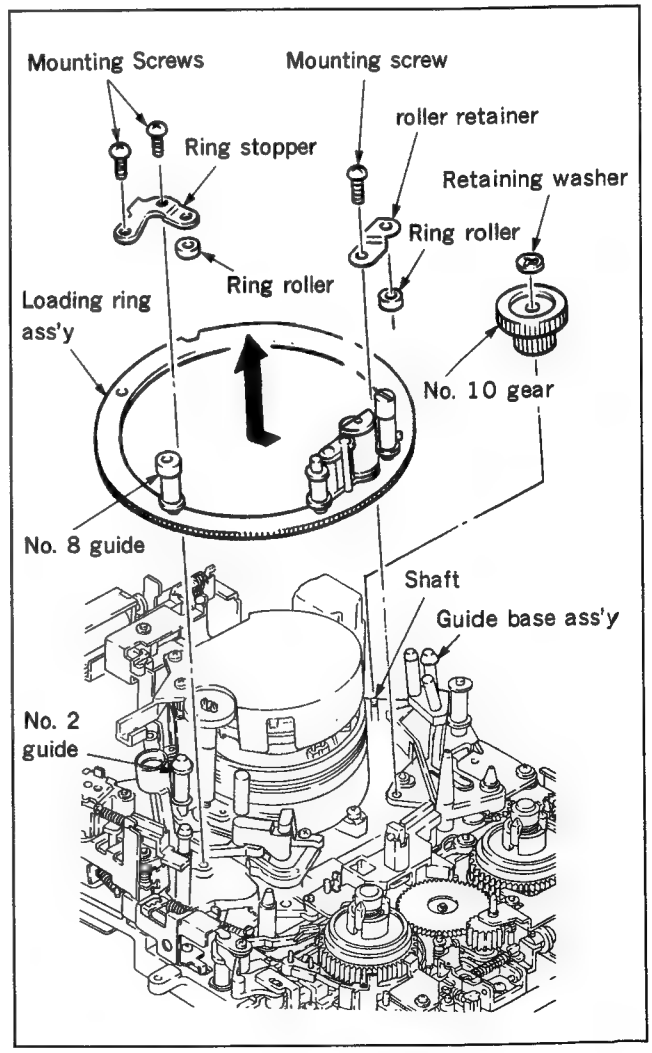


Fig. 4-4-1 Loading ring ass'y removal

11. Roller retainer installation
Install the ring roller and roller retainer. Secure them with the screw. (Confirm that the loading ring ass'y fits with the three ring rollers.)

12. No. 10 gear installation (Fig. 4-4-2)
1) Apply a 1/2 drop of oil on the mounting shaft of the No. 10 gear.

2) Confirm that the protrusion of the drive changer ass'y is located in the notch of the L switch ass'y. Insert the No. 10 gear phase adjustment tool as shown in the figure.

3) While pushing the No. 8 guide ass'y onto the ring stopper, install the No. 10 gear ass'y with the retaining washer.

4) Pull out the No. 10 gear phase adjustment tool.

13. Cleaning roller installation
Install the cleaning roller ass'y referring Section 4-5, and check the pressure.

14. Connector insertion
Connect the connector of drum's upper side harness to VRA-4 board and fix it together with cassette compartment harness with harness clamp.

15. Mode selector removal
Press the L mode select button to enter the LOADING TOP mode. Next, remove the mode selector from the unit.

16. Cassette compartment ass'y installation
Install the cassette compartment ass'y by reversing the steps of Section 2-7.

17. Mechanical deck installation
Install the mechanical deck by reversing the steps of Section 2-6.

18. Tape transport adjustment
Adjust the tape transport referring to Section 6.

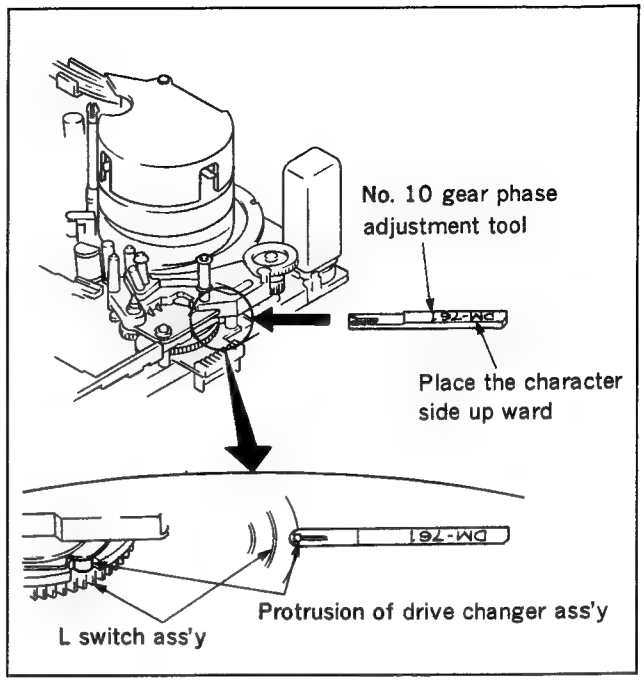


Fig. 4-4-2 No. 10 gear installation

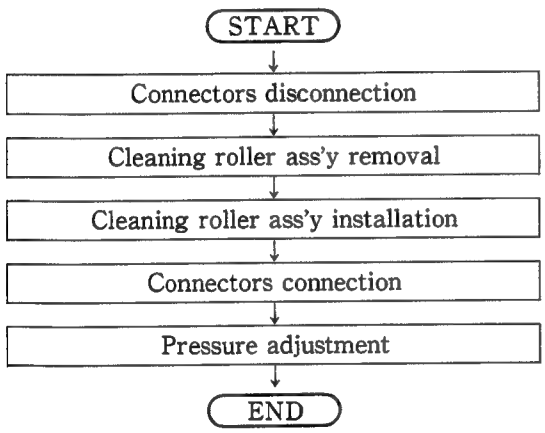
4-5. CLEANING ROLLER ASS'Y REPLACEMENT

Basic Knowledge

A The cleaning roller ass'y can either be replaced with complete whole assembly or the component part of the cleaning roller ass'y. The following is a description of the component part replacement of the cleaning roller ass'y. (See Fig. 4-5-1.)

- 4-5-1 CR limiter arm replacement
- 4-5-2 CR roller ass'y replacement
- 4-5-3 Plunger solenoid replacement

B Replacement flow chart



Replacement Procedure

1. Disconnect the connector
   Disconnect the plunger solenoid connector from CN-551.
2. Cleaning roller ass'y removal
   Remove the two screws shown in Fig. 4-5-1, then remove the cleaning roller ass'y.
3. Cleaning roller ass'y installation
   See Fig. 4-5-2,②.
4. Connectors connection
   Connect each connector in the reverse order to step 1.
5. Pressure adjustment
   Refer to step 11. of Section 4-5-1.

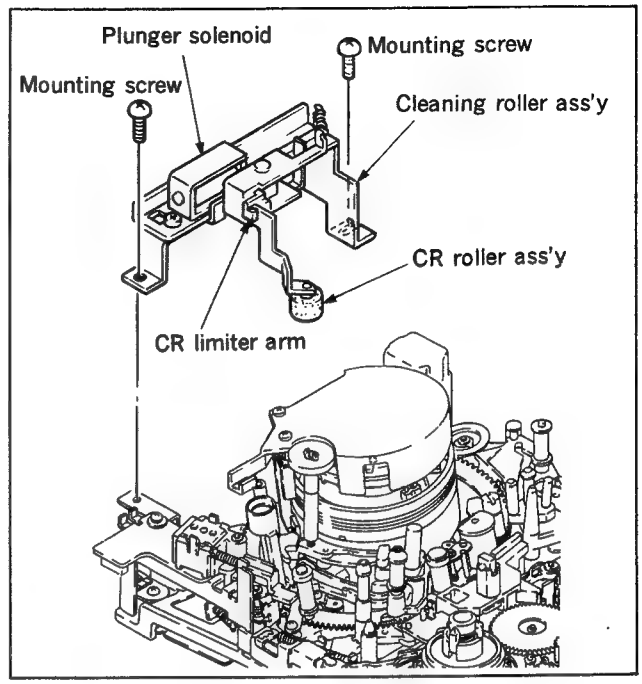


Fig. 4-5-1 Cleaning roller ass'y removal

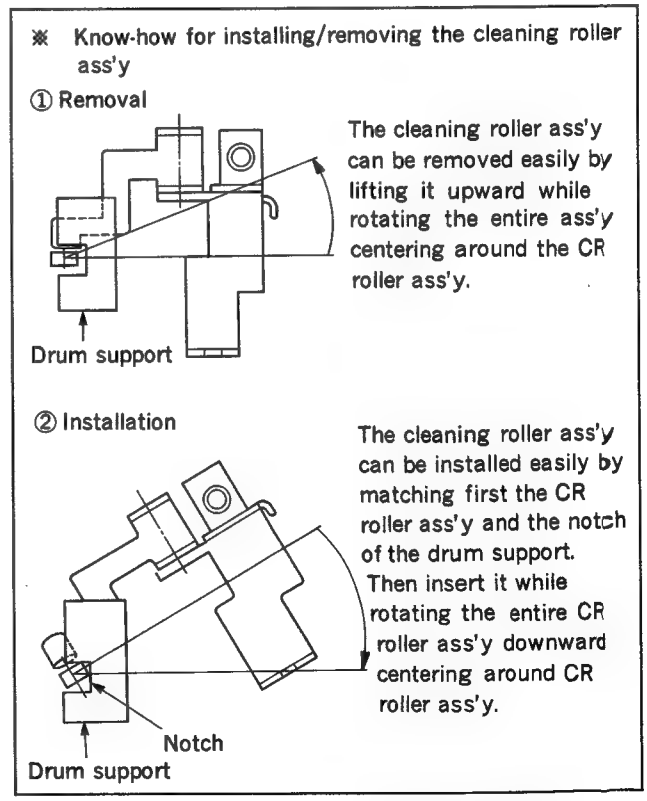


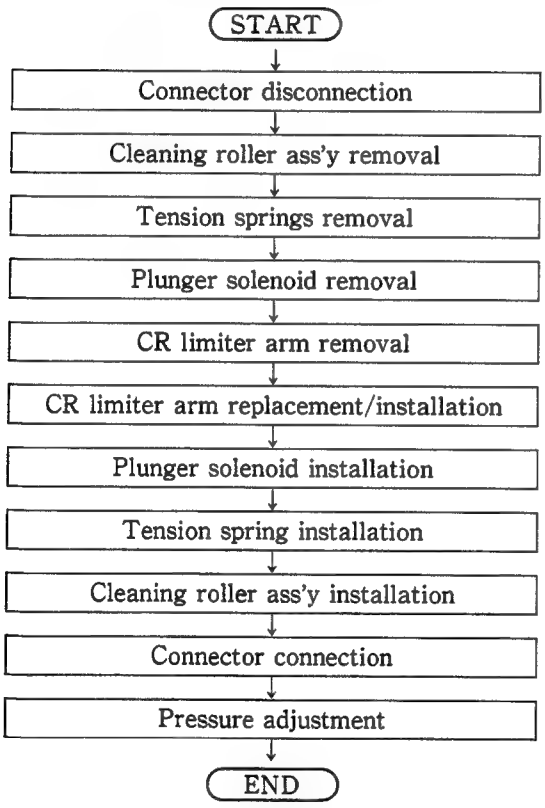
Fig. 4-5-2 Cleaning roller installation/removal

4-5-1. CR Limiter Arm Replacement

Basic Knowledge

A 1)Replace the CR limiter arm without removing the mechanical deck from the unit.
2)To replace the CR limiter arm, the cleaning roller ass'y should be removed from the mechanical deck before the CR limiter arm removal. (Fig. 4-5-3)
3)When removing the plunger solenoid take care so as not to lose the iron core of the plunger because it is very easy to lose.

B Replacement flow chart



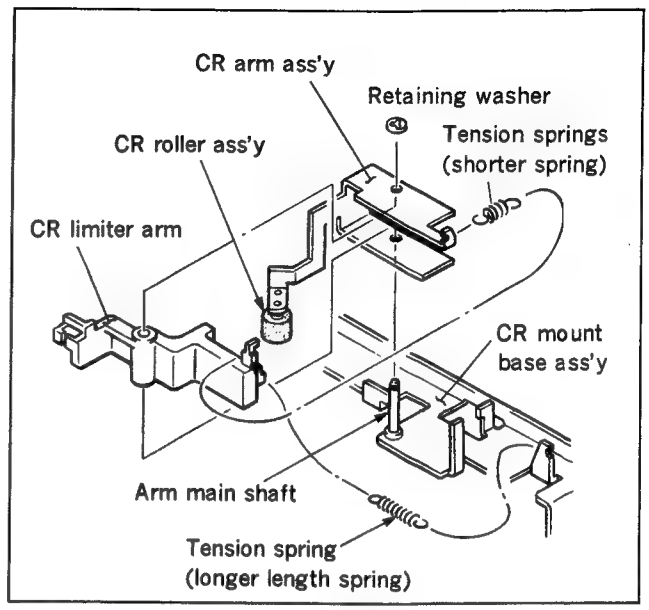


Fig. 4-5-3 CR limiter arm replacement

Replacement Procedure

1. Connector disconnection
Disconnect the connector of the plunger solenoid, from CN551 board.

2. Cleaning roller ass'y replacement (Fig. 4-5-1)
Remove the two screws as shown in the figure, then remove the cleaning roller ass'y.

3. Tension springs removal
   Remove the two tension springs connecting between the CR arm ass'y and CR limiter arm, and the CR limiter arm between the CR mount base ass'y, respectively.

4. Plunger solenoid removal
   Remove the screw securing the solenoid, then remove the plunger solenoid together with the plunger base.

5. CR limiter arm removal (Fig. 4-5-3)
   1) Remove the retaining washer from the top of main shaft of the CR arm securing the CR arm ass'y. Remove the CR arm ass'y and the CR limiter arm simultaneously from the main shaft.

   2) Remove the old CR limiter arm that has been used in the CR arm ass'y, and install a new CR limiter arm into the CR arm ass'y.

6. CR limiter arm replacement/installation
   1) Install a new CR limiter arm in the CR arm ass'y.

   2) Insert the CR arm ass'y into the arm shaft of the CR mount base ass'y, then secure it with a new retaining washer.

7. Plunger solenoid installation
   Install the plunger solenoid with plunger base that was removed in step 4, on the CR mount base ass'y with screw snugly, but do not tightened.
8. Tension springs installation
   Install the tension springs that were removed in step 3 to their original locations. (Hook the longer length tension spring to the CR limiter arm and CR mount base ass'y.)

9. Cleaning roller ass'y installation
   1) While taking care not to damage the drum ass'y by the CR arm ass'y. Install the cleaning roller ass'y in the mechanical deck.

   2) Install the cleaning roller ass'y in the mechanical deck with the two screws.

   3) Connect the connector of the plunger solenoid to the CN551 board.

Note: Arrange the harness so that it will not close to tape run path.

10. Connector connection
    Connect the connector of the plunger solenoid by reversing step 1.

11. Pressure adjustment (Fig. 4-5-4)
    1) Push the iron core of the plunger solenoid into the pressed position. move the entire plunger base left and right and see the result.

    2) Then the CR limiter arm will move left and right against the CR arm ass'y at A portion as shown in Fig. 4-5-4.
    Confirm the position where the CR arm ass'y is located at the center of the opening of the CR limiter arm.
    Check to see that the above specifications are satisfied when drum is rotated by hand with solenoid pressed state.

    3) Tighten then the screw that was snugly tightened in step 7, at the position confirmed in step 2), that secures the plunger base. Apply screw locking paint to the screw.

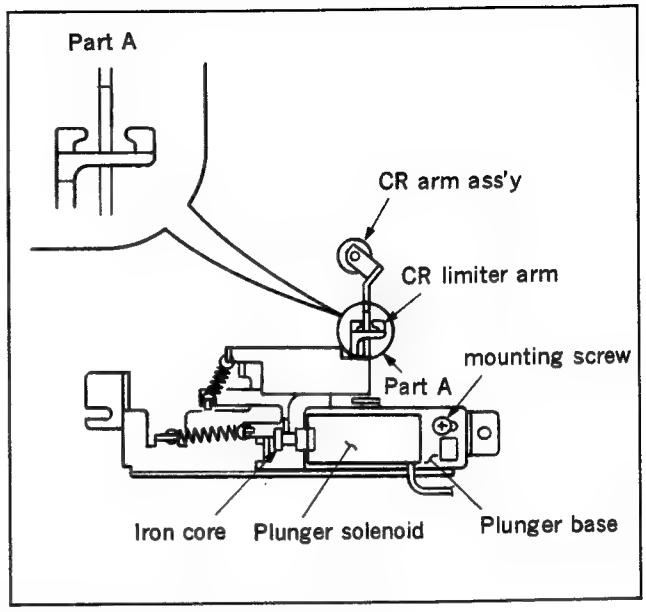


Fig. 4-5-4 Pressure adjustment

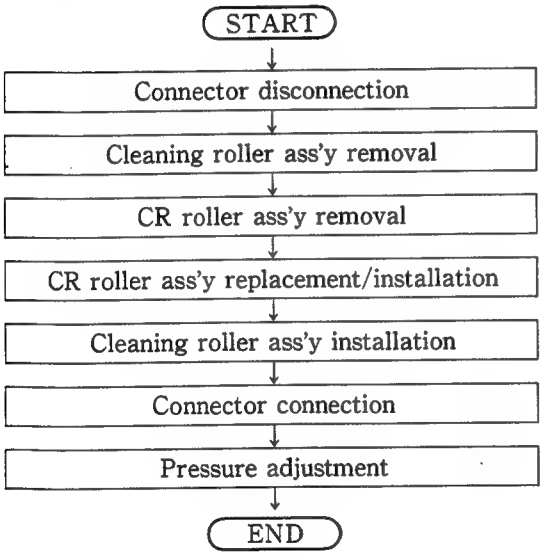
4-5-2. CR Roller Ass'y Replacement

Basic Knowledge

A The CR roller ass'y is the periodic maintenance replacement part. Replace it every 1,000 hours of drum rotation.

B To replace the CR roller ass'y, the cleaning roller ass'y should be removed from the unit before CR roller ass'y removal. Take care not to damage the drum ass'y nor the guide roller when removing the cleaning roller ass'y, and also installing it again.

C Replacement flow chart



Replacement Procedures

1. Connector removal
   Disconnect the connector from CN-551 board.

2. Cleaning roller ass'y removal (Fig. 4-5-5)
   Remove the two screws securing the cleaning roller ass'y on the mechanical deck. Remove the cleaning roller ass'y.

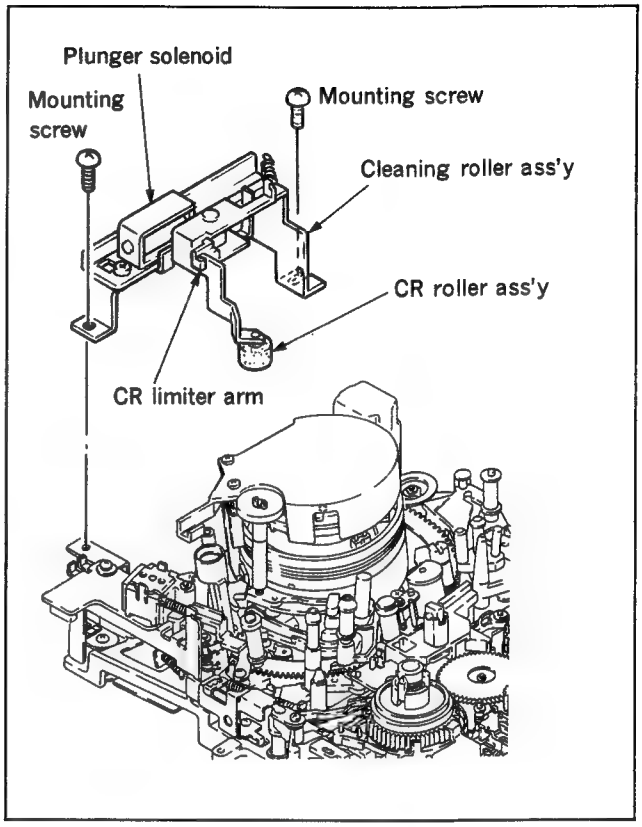


Fig. 4-5-5 Cleaning roller ass'y removal

3. CR roller ass'y removal (Fig. 4-5-6)
   Remove the washer securing the CR roller ass'y to the HC roller shaft of the CR arm ass'y. Remove the CR roller ass'y.

4. CR roller ass'y replacement/installation
   Prepare a new CR roller ass'y. Install it into the HC roller shaft, and insert a new washer.

5. Cleaning roller ass'y installation
   By reversing the above step 1 and step 2 install the cleaning roller ass'y and connect the connector. Place the harness so as not to touch the tape run system.

6. Connector installation

7. Pressure adjustment
   Perform adjustment referring to step 11. of Section 4-5-1.

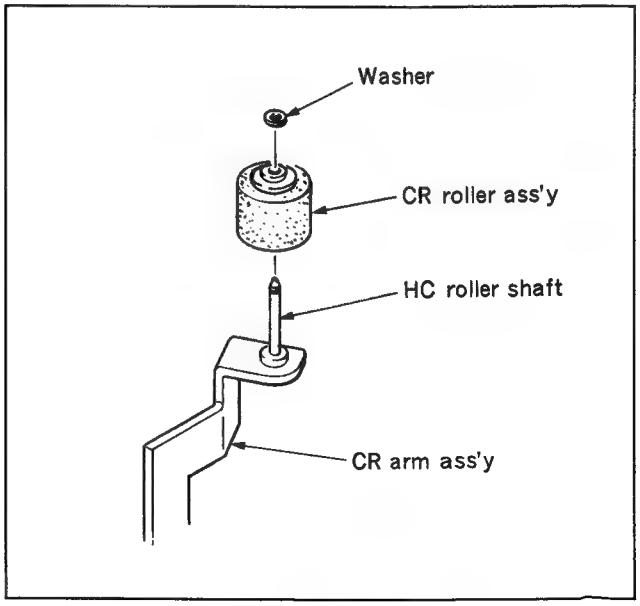


Fig. 4-5-6 CR roller ass'y replacement

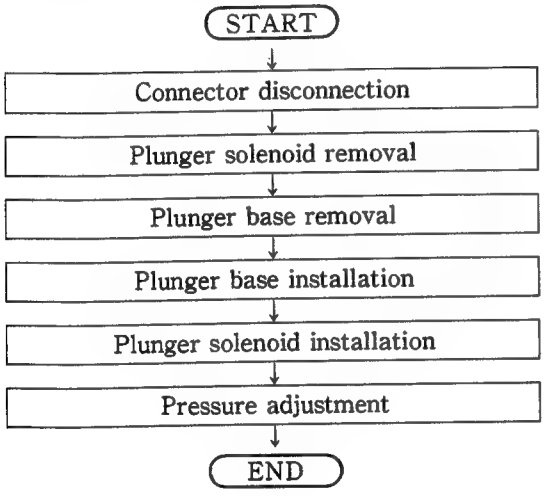
4-5-3. Plumger Solenoid Replacement (For cleaning roller)

Basic Knowledge

A The plunger solenoid of the cleaning roller ass'y can be replaced without removing the cleaning roller ass'y from the unit.

B Plunger solenoid is the periodic maintenance parts. Replace it every 3000 hours of drum rotation hour.

C Replacement flow chart



Replacement Procedure

1. Connector disconnection
   Disconnect the connector of the plunger solenoid from CN551 board.

2. Plunger solenoid removal
   Remove the screw that secures plunger base on the CR mount base ass'y. Remove then the plunger solenoid together with plunger base.

3. Plunger base removal
   Remove the two screws securing the plunger solenoid to the plunger base. Remove the plunger base.

4. Plunger base installation
   Prepare a new plunger solenoid. Install it to the plunger base with two screws.
   Note: Be sure to install the plunger solenoid to the plunger base so that the square and round holes come to the harness side of the plunger solenoid.

5. Plunger solenoid installation
   Install the plunger base on the CR mount base ass'y with the mounting screw snugly, but do not tightened.

6. Pressure adjustment
   Perform adjustment referring to step 11. of Section 4-5-1.

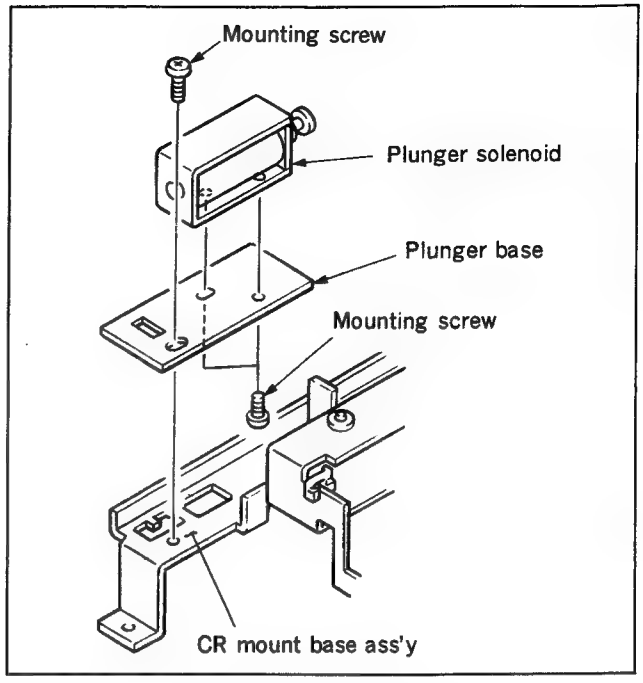


Fig. 4-5-7 Plunger solenoid replacement

4-6. PINCH ROLLER ARM ASS'Y REPLACEMENT

Basic Knowledge

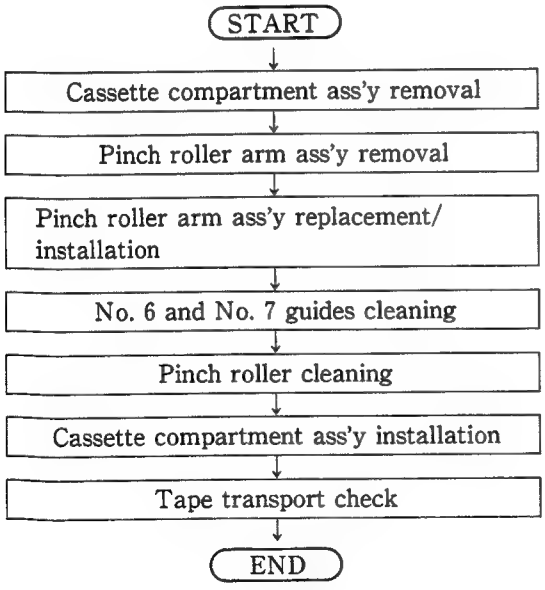
A Replacement of the pinch roller arm ass'y includes removal and installation of tension spring in a very small space. Take care not to damage surrounding parts in this replacement.

B The pinch roller arm ass'y is periodic maintenance replacement part. It is recommended that this part should be replaced based on the periodic replacement list every 1000 hours of drum rotation hour.

C Prepare the following items for replacement.

- Precision screwdriver :
  (1.4 mm Phillips head)
- Cleaning fluid :
  Sony part No. Y-2031-001-1
- Wiping cloth :
  Sony part No. 7-741-900-53

D Replacement flow chart



Replacement Procedure

1. Cassette compartment ass'y removal
   Remove the cassette compartment ass'y referring to Section 2-7.

2. Pinch roller arm ass'y removal (Fig. 4-6-1)
   1) Remove the retaining washer securing the pinch roller arm ass'y.

   2) Change the hook position of the tension spring that has been hooked to the No. 7 guide ass'y, but change it to hook to the pinch roller arm notch. (Fig. 2)

   3) Push the pinch roller arm ass'y in the direction shown by arrow A, then pull it upward (B direction) and remove it. (Fig. 1)

   4) Remove the torsion coil spring. (Fig.3)

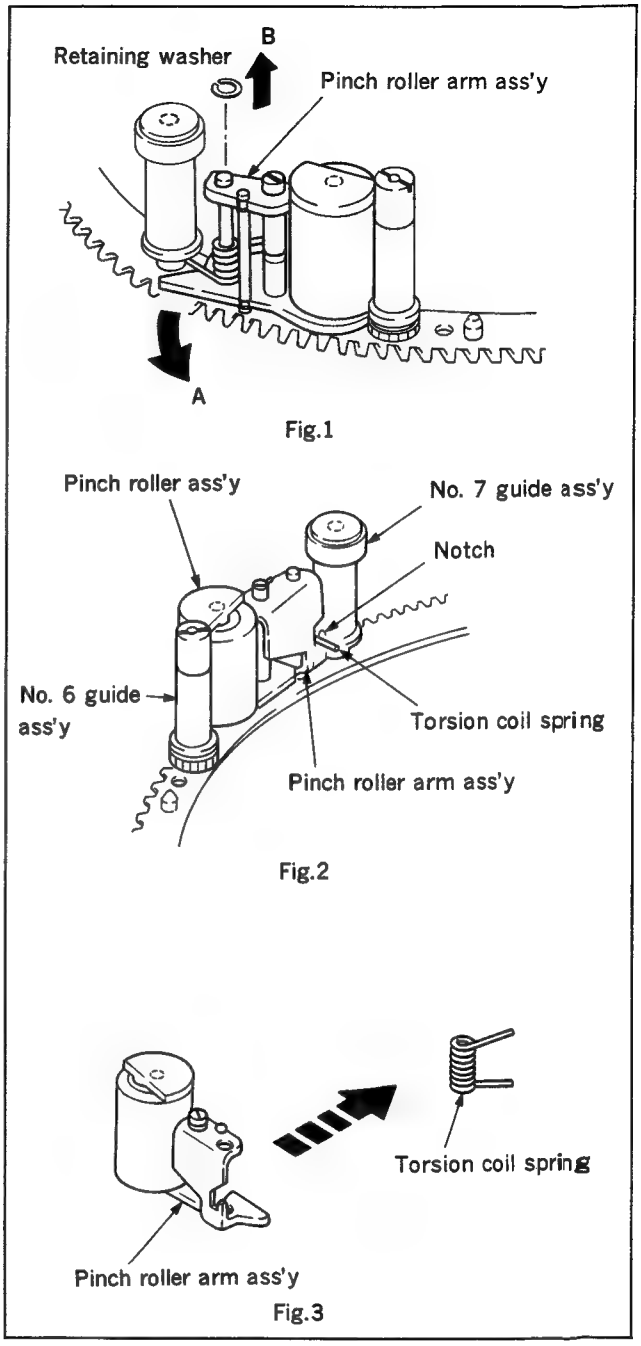


Fig. 4-6-1 Pinch roller arm ass'y removal

3. Pinch roller arm ass'y replacement/installation (Fig. 4-6-2)
   1) Prepare a new pinch roller arm ass'y.
   2) Install the torsion coil spring to the pinch roller arm ass'y. Hook the lower end of the spring to the notch of the pinch roller arm ass'y. (Fig.1)
   3) Insert a thin material such as a precision screwdriver into the hole of the pinch roller arm ass'y, then pass it through the hole of the torsion coil spring. (Fig.2)
   4) Bring the screwdriver tip to the top end of the shaft of the loading ring ass'y as shown in the figrue, and then install the pinch roller ass'y into the shaft.
   5) Hook the lower end of the torsion coil spring on the No. 7 guide ass'y. (Be careful of the spring hook position.) Ensure that the top end of the spring is hooked to the A portion. (Fig.3)

4. No. 6 and No. 7 guides ass'y cleaning
   Clean the No. 6 and No. 7 guide ass'y with a wiping cloth moistened with cleaning fluid. After that, be sure to wipe them with a dry cloth two or three times.

5. Pinch roller cleaning
   Clean the pinch roller with a wiping cloth moistened with cleaning fluid. After that, be sure to wipe them with a dry cloth two or three times.

6. Cassette compartment ass'y installation
   Install the cassette compartment ass'y by reversing the steps of Section 2-7.

7. Tape transport check
   Check the tape transport referring to Section 6-6.

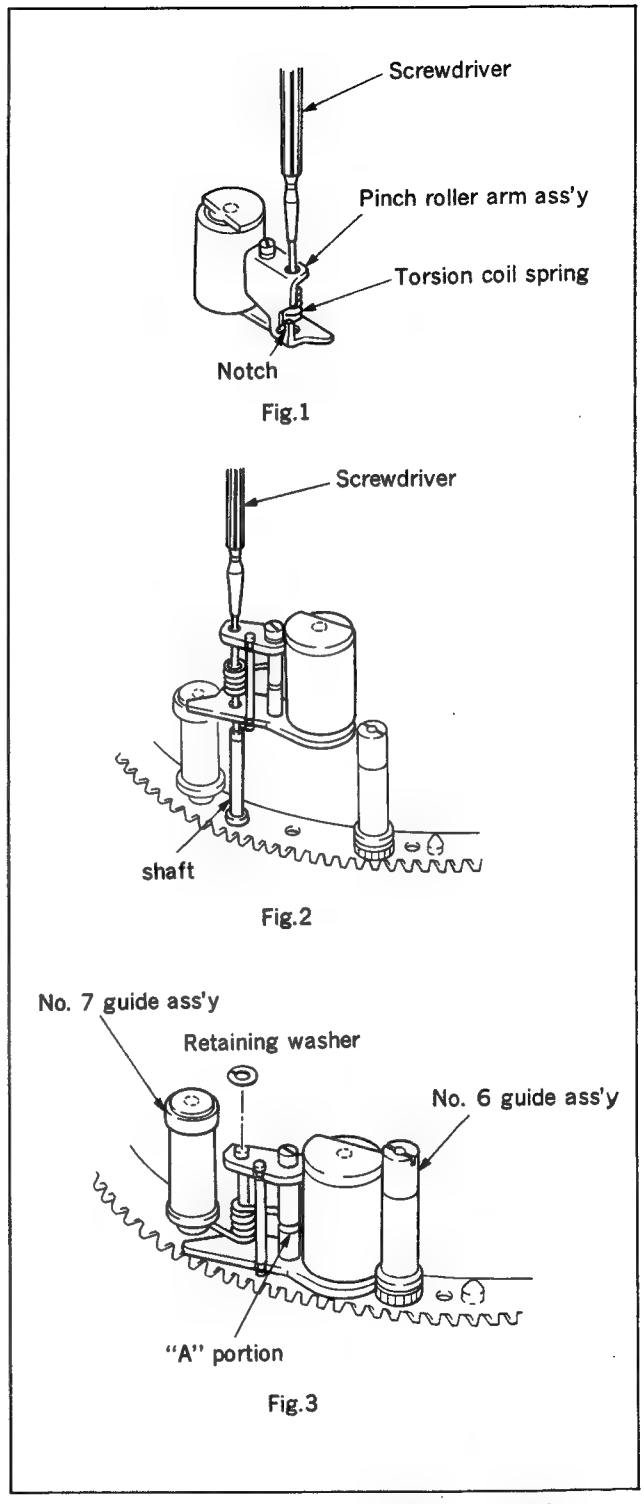


Fig. 4-6-2 Installing the pinch roller arm ass'y

4-7. CAPSTAN MOTOR REPLACEMENT

Basic Knowledge

A 1)Before replacing the capstan motor, remove the mechanism deck (see Section 2-6) from the unit and also the cassette compartment ass'y (see Section 2-3) from the unit.

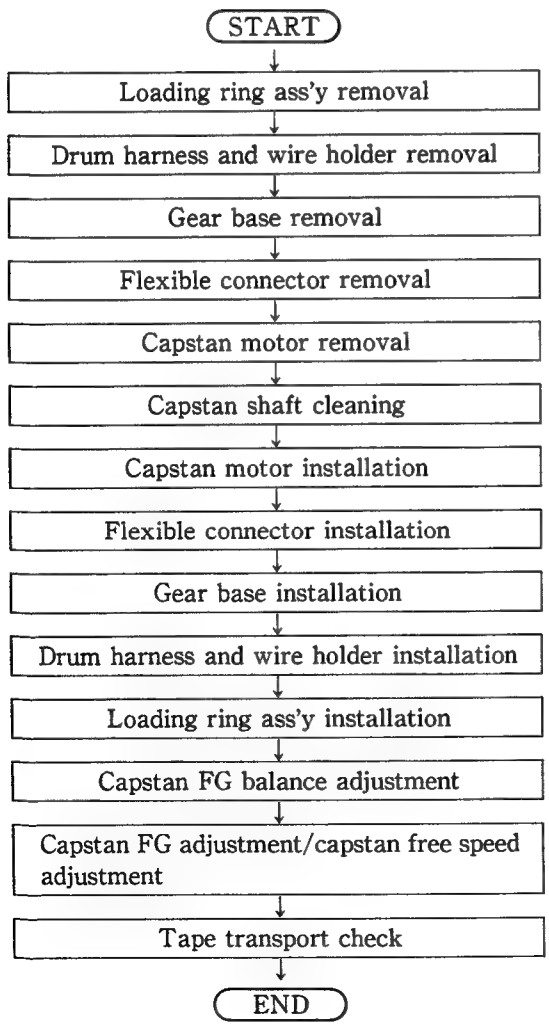
2)The capstan motor replacement includes removal of the loading ring ass'y as well. Take care not to lose the component parts of the removed loading ring ass'y.

3)Before starting replacement work, refer to A-2) of basic knowledge in Section 4-4.

B Prepare the following items for the replacement.

- Cleaning fluid :
  Sony part No. Y-2031-001-1
- Wiping cloth :
  Sony part No. 7-741-900-53

C Replacement flow chart



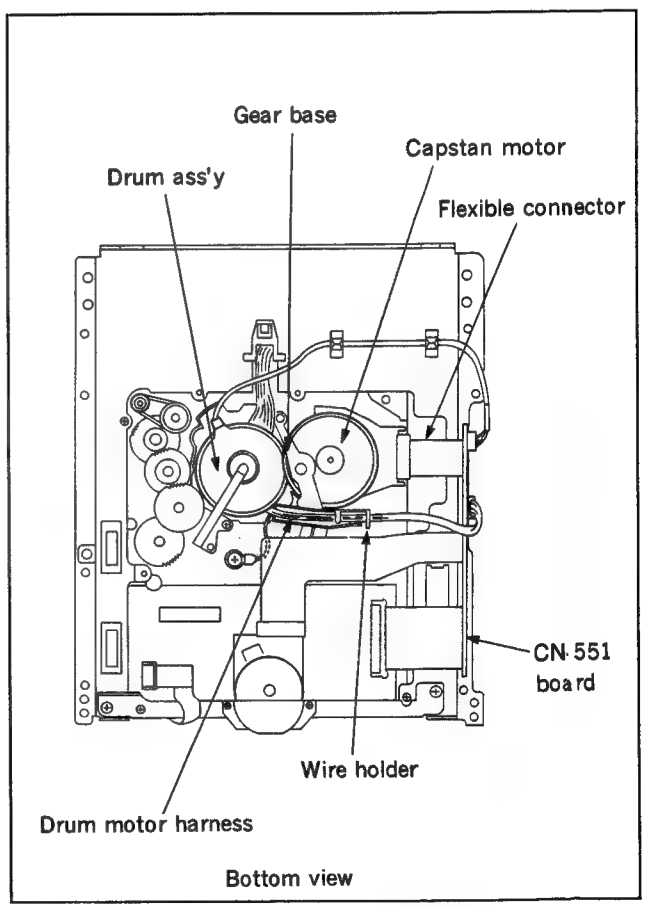


Fig. 4-7-1 Bottom view of the mechanism deck

Replacement Procedures

1. Loading ring ass'y removal
   Remove the loading ring ass'y referring to Section 4-4.

2. Drum motor harness and wire holder removal (Fig. 4-7-2)
   1) Remove the drum motor harness shown in Fig. 4-7-1 from the wire holder.
   2) Remove the mounting screw of the wire holder, then remove the wire holder.

3. Gear base removal (Fig. 4-7-2)
   Removal the mounting screw of the gear base, then remove the gear base.

4. Flexible connector removal
   Remove the flexible connector from capstan motor.

5. Capstan motor removal
   Remove the two mounting screws securing the capstan motor on top of the mechanism deck. Remove the capstan motor in the arrow B direction.

6. Capstan shaft cleaning
   Clean the shaft of a new capstan motor with a wiping cloth moistened with cleaning fluid. Then be sure to wipe it with a dry cloth two or three times.

7. Capstan motor installation

8. Flexible connector installation

9. Gear base installation

10. Wire holder and drum motor harness installation

11. Loading ring ass'y installation

Above steps 7 thru 11, parts installation, reverse the procedures from steps 1 thru 5.

12. Capstan FG adjustment/Capstan free speed adjustment
    Perform these adjustments referring to Section 8-3./8-4.

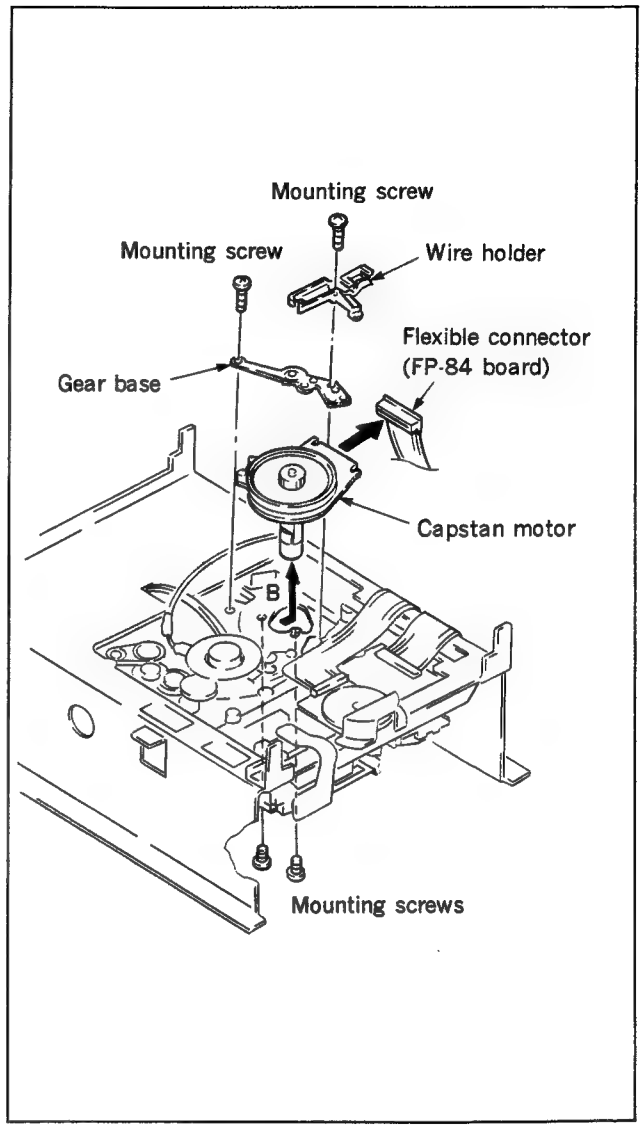


Fig. 4-7-2 Capstan motor replacement

13. Tape transport check

Check the tape transport at flanges (shown by arrow) of each guide, during playback mode and REV mode.

No. 1 guide, No. 2 guide, No. 5 guide ···Tape should keep contacting with either flange of guide during tape run and tape curl must be less than 0.3 mm.

No. 6 guide ···Tape should keep contacting with flange all the time during tape run, and there should be no tape curl.

No. 4 guide ···Tape should keep contacting with flange of tape guide at all time duing tape run and tape curl must be less than 0.3 mm.

If adjustment must be performed by this check, refer to Tape Transport Adjustment of Section 6.

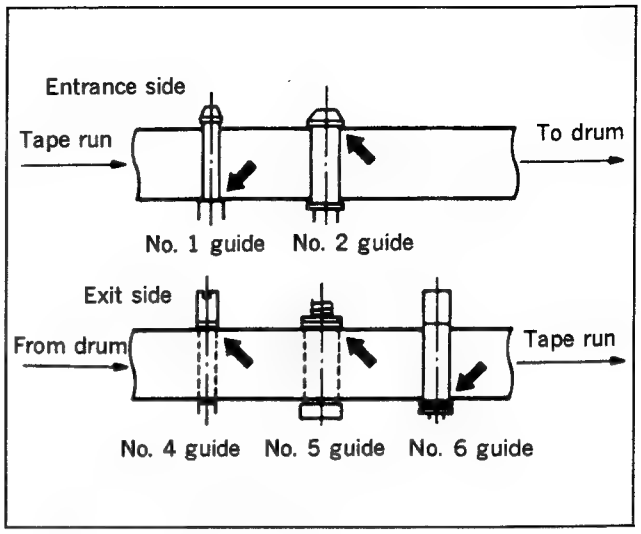


Fig. 4-7-3 Tape run check

4-8. L MOTOR ASS'Y REPLACEMENT

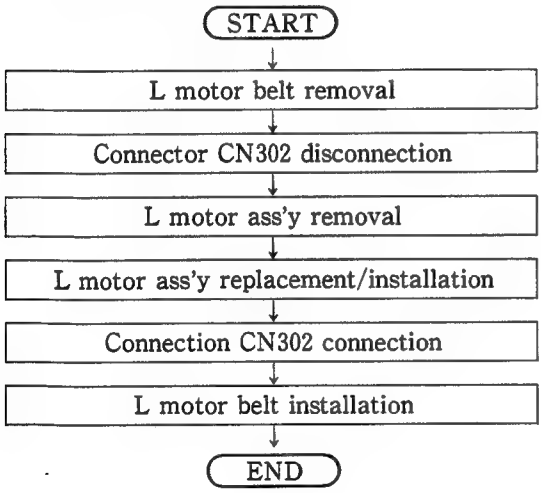
Basic Knowledge

A1) Before replacing the L motor ass'y, remove the mechanical deck from the unit. Refer to Section 2-6 when replacing the L motor ass'y.

2) The L motor belt is the periodic maintenance parts. Replace it every 1000 hours of drum rotation hour. See this section for replacement procedure.

B Prepare the following items for the replacement.
- Cleaning fluid:
  Sony part No. Y-2031-001-1
- Cloth or gauze

C Replacement flow chart



Replacement Procedure

1. L motor belt removal
   Remove the L motor belt hooked between the L motor and the No. 1 gear ass'y. (See Fig. 1)

Note: Never use a sharp material or like that has sharp edge to remove the L motor belt because it may give damage to the belt. Belt can be broken even with small damage.

2. Connector CN302 disconnection
   Disconnect connector CN302 from the RS-31 board. (If FP-22 flexible board has been removed beforehand, it is easier to remove.)

3. L motor ass'y removal
   Remove the two mounting screws securing the L motor ass'y to the rear of the mechanical deck. Remove the L motor ass'y.

4. L motor ass'y replacement/installation
   Install the new L motor ass'y on the mechanical deck with the two mounting screws.

Note: Install the L motor ass'y so that the harness is faced to the side panel.

5. Connector CN302 connection
   1) Bind the L motor ass'y harness to the chassis of the mechanical deck. Connect connector CN302 to the RS-31 board.
   2) Connect FP-22 flexible board.

6. L motor belt installation
   1) Clean the belt with a wiping cloth moistened with cleaning fluid. Then wipe it with a dry cloth.
   2) Before installing the belt, check to see the belt has no damage. If there is any damage, replace the belt with a new one.
   3) Carefully hook the belt in the groove of the motor pulley and the No. 1 gear ass'y. (See Fig. 2.)

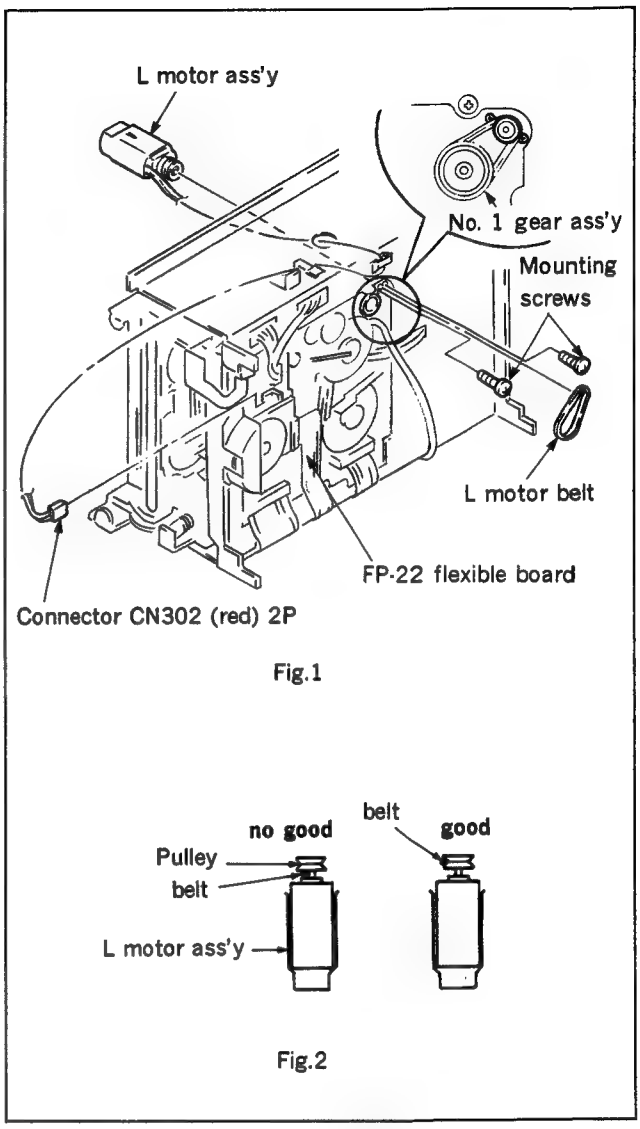


Fig. 4-8-1 L motor ass'y replacement

4-9. REEL MOTOR REPLACEMENT

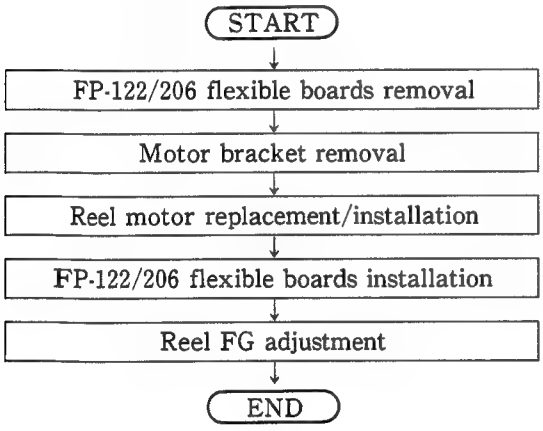
Basic Knowledge

A Before replacing the reel motor, remove the mechanical deck from the unit. Remove the reel motor referring to Section 2-6.

B Reel motor, motor cover and motor bracket are assembled into one piece. Replace it as an unit, as shown in Fig. 4-9-1.

C The reel motor is the periodic maintenance parts. The reel motor must be replaced every 3,000 hours of drum rotation hour. Replace the reel motor referring to this Section.

D Replacement flow chart



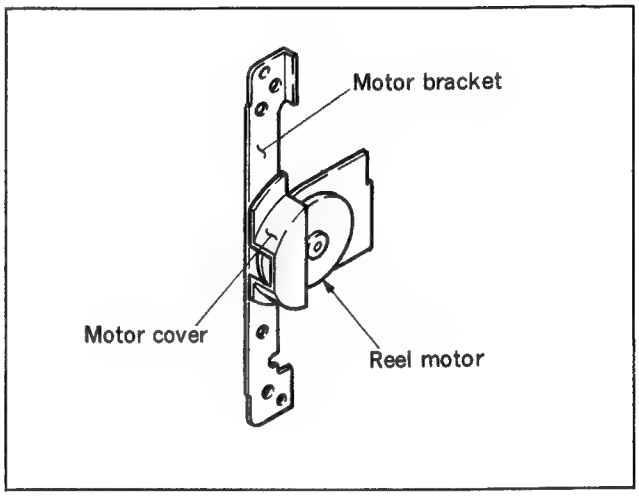


Fig. 4-9-1 Reel motor

Replacement Procedure

1. FP-122/206 flexible board removal
   1) Remove the FP-122 flexible board from the reel motor board.
   2) Remove the FP-206 flexible board from the RS-31 board.

2. Motor bracket removal (Fig. 4-9-2)
   Remove the two mounting screws of the motor bracket, then remove the motor bracket.

3. Reel motor replacement/installation
   Prepare a new reel motor. Install the new reel motor to the mechanical deck, and secure it with two mounting screws.

4. FP-122/206 flexible boards installation
   Install the flexible boards in the reverse order of step 1.

5. Reel FG adjustment
   Perform this adjustment referring to Section 8-5.

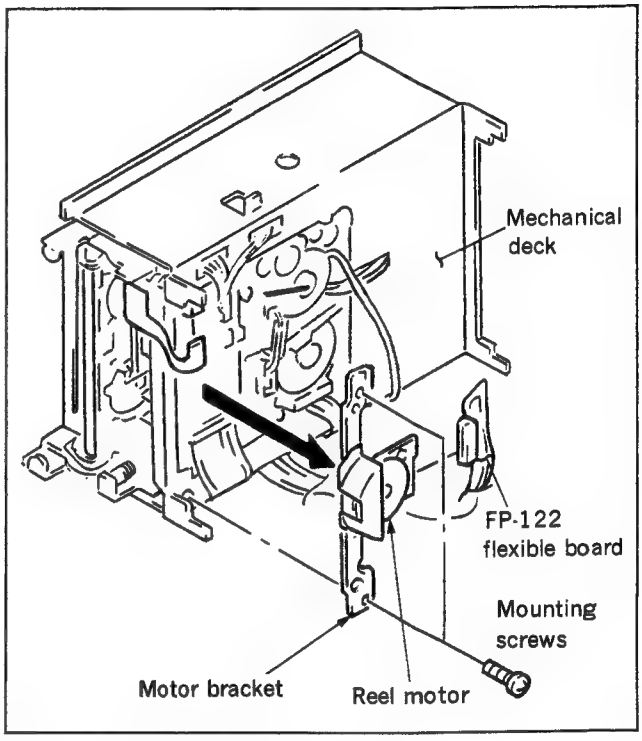


Fig. 4-9-2 Motor bracket removal

4-10. No. 4 GUIDE REPLACEMENT

Basic Knowledge

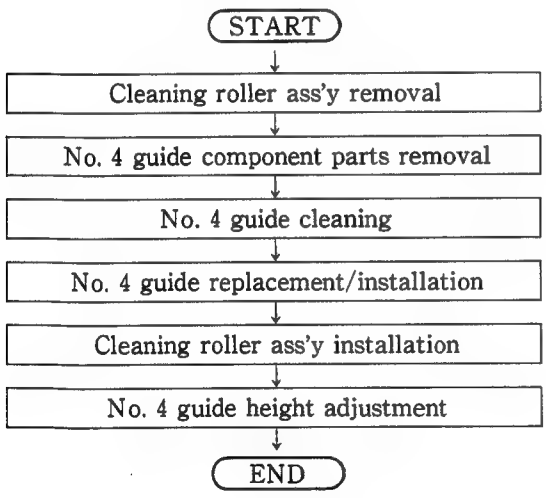
A1) The No. 4 guide is located in a small space of the unit. So, before removing the No. 4 guide, remove the cleaning roller ass'y.

2) The No. 4 guide is located near the drum ass'y. When using tools such as a screwdriver or tweezers, be very careful not to damage to the drum or the rotary head.

B Prepare the following items for the replacement.

- Cleaning fluid:
  Sony part No. Y-2031-001-1
- Wiping cloth:
  Sony part No. 7-741-900-53

C Replacement flow chart



Replacement Procedure

1. Cleaning roller ass'y removal (Fig. 4-10-1)
   Remove the two mounting screws of the cleaning roller ass'y. Remove the cleaning roller ass'y.

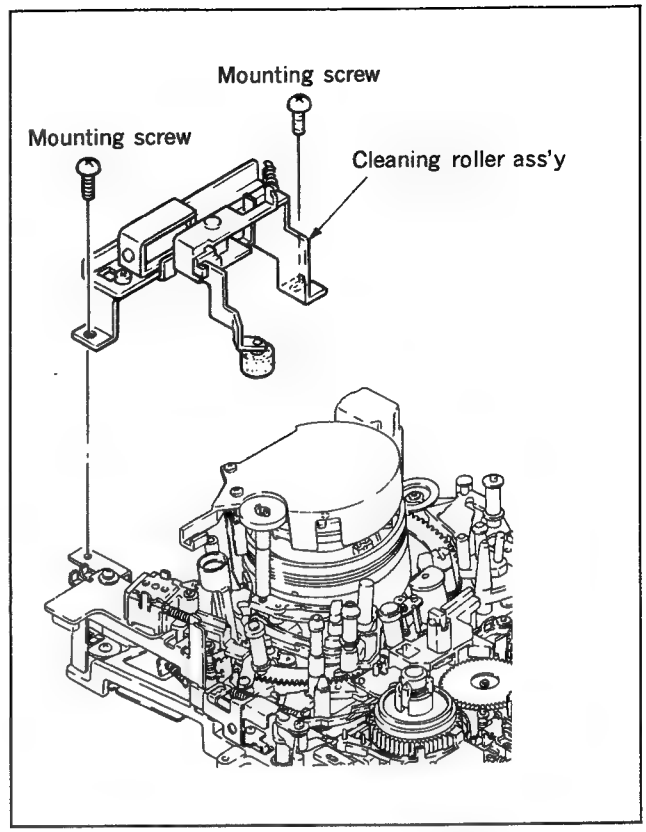


Fig. 4-10-1 Cleaning roller ass'y removal

2. Removing the component parts of No. 4 guide (Fig. 4-10-2)
   When guide nut is removed, the component parts of the guide flange, No. 4 guide, and compression spring can be removed from the main shaft in that sequence.

3. No. 4 guide cleaning
   Clean a new No. 4 guide and the main shaft, with a cleaning cloth moistened with cleaning fluid. Be sure to wipe them with a dry cloth two or three times.

4. No. 4 guide replacement/installation
   Install the parts that are cleaned in above step 3, into the main shaft by reversing the step 2 procedure.

5. Cleaning roller ass'y installation
   Install the cleaning roller ass'y to the mechanical deck with two mounting screws. Execute the pressure check. (See Section 4-5-1.)

6. No. 4 guide height adjustment
   Perform height adjustment referring to Section 6-3.

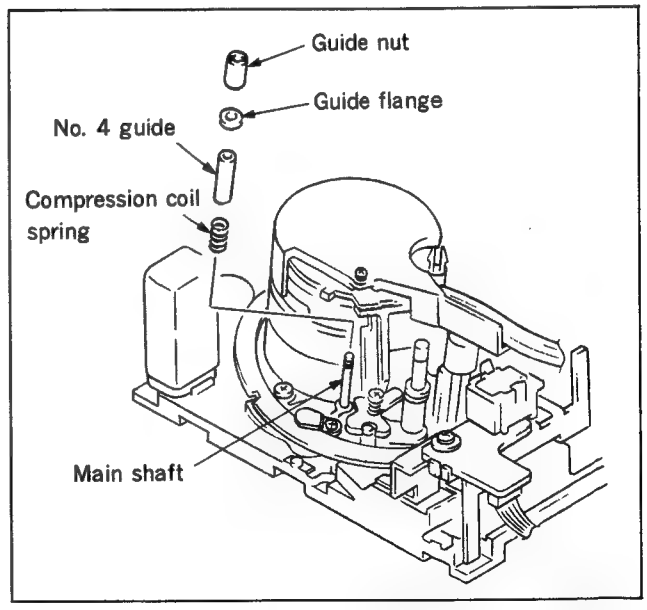


Fig. 4-10-2 Individual parts removal of No. 4 guide

4-11. ENTRANCE GUIDE (K) ASS'Y (No. 2 GUIDE ASS'Y) REPLACEMENT

Basic Knowledge

A 1)Entrance guide (K) ass'y can be removed when the loading ring is in the unthreaded end position. Check to see that the loading ring has reached completely at the unthreaded end position.

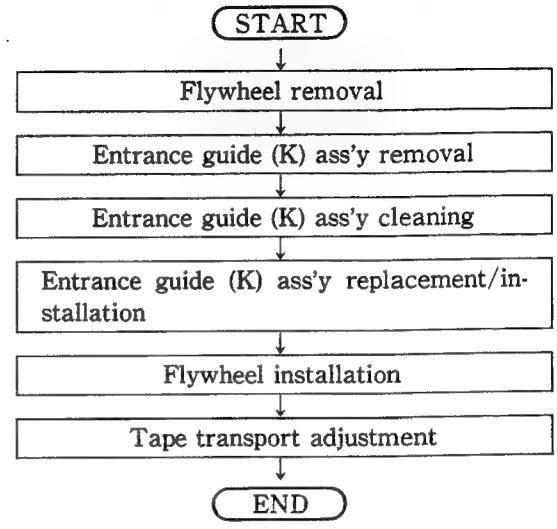
2)If it is necessary to replace the No. 2 guide ass'y and the No. 3 guide, replace the entire entrance guide (K) ass'y.

3)The entrance guide (K) ass'y is located close to the drum ass'y. There is a risk of giving damage to the drum ass'y during replacement work. So be careful. Particularly, be careful of the rotary head. Attempt the replacement work after rotating the rotary upper drum counterclockwise so that the rotary head is away from the entrance guide (K) ass'y.

B Prepare the followings items for the replacement.

- Cleaning fluid :
  Sony part No. Y-2031-001-1
- Wiping cloth :
  Sony part No. 7-741-900-53

C Replacement flow chart



Replacement Procedure

1. Flywheel removal (Fig. 4-11-1)
   Remove the flywheel while pinching claws of the IP roller guide.

2. Entrance guide (K) ass'y removal
   Remove the two mounting screws shown in Fig. 4-11-1. Remove the entrance guide (K) ass'y.

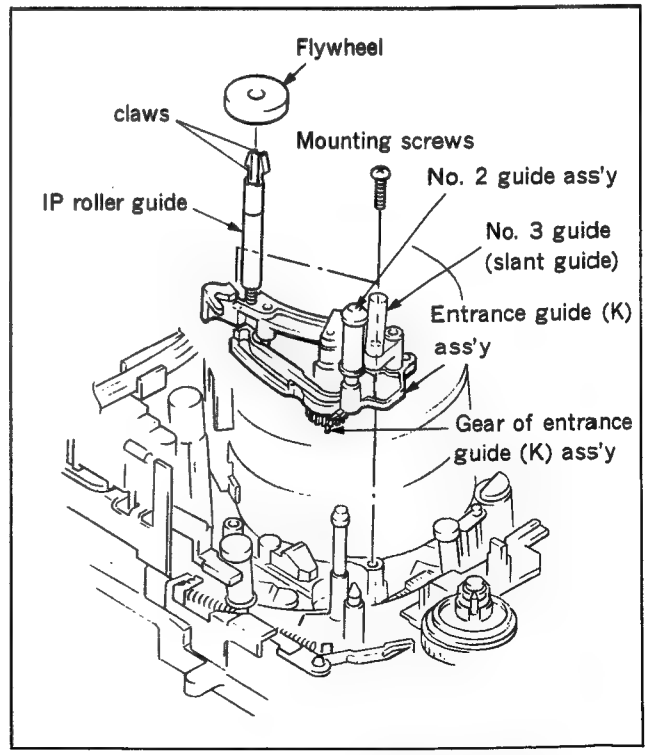


Fig. 4-11-1 Parts of entrance guide (K) ass'y

3. Entrance guide (K) ass'y cleaning
   1) Clean the IP roller guide, No. 2 guide ass'y and No. 3 guide with a wiping cloth moistened with cleaning fluid. Be sure to wipe them with a dry cloth two or three times.
   2) Clean the mounting surface of the entrance guide (K) ass'y and also the entrance guide (K) ass'y of the mechanical deck following the same procedure as above.

4. Entrance guide (K) ass'y replacement/installation
   1) Hold the loading ring to the unthreaded end position, then install a new entrance guide (K) ass'y in the mechanical deck.

   2) When installing the entrance guide (K) ass'y, be sure that the gear of the entrance guide (K) ass'y and the teeth of the L slider ass'y should have the relative positions as shown in Fig. 4-11-2.

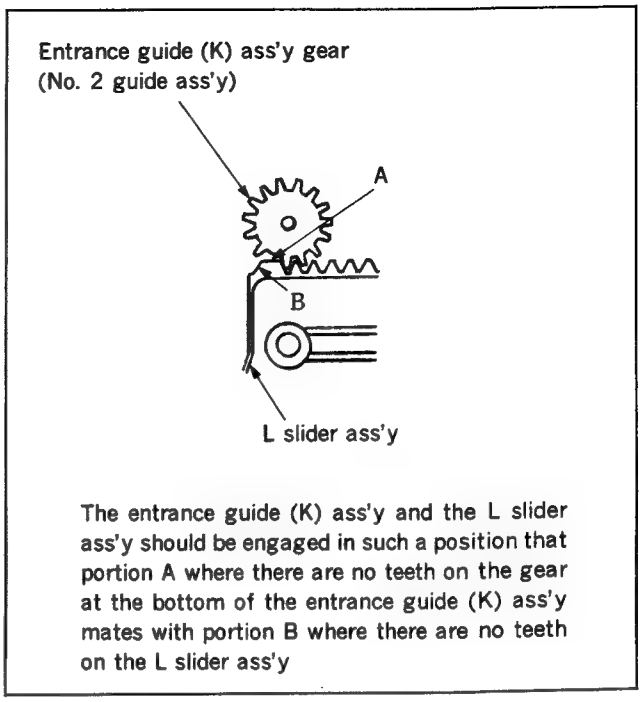


Fig. 4-11-2 Engaging the entrance guide (K) ass'y gear

   3) Secure the entrance guide (K) ass'y to the mechanical deck with the two mounting screws.
   When installing, move the ass'y in clockwise direction (A direction in Fig.) and tighten the srews.

5. Flywheel installation
   Hold the flywheel with the larger hole facing bottom. Then push the flywheel into the IP roller guide untill it clicks into position.

6. Tape transport adjustment
   Then perform tape transport adjustment according to Section 6.

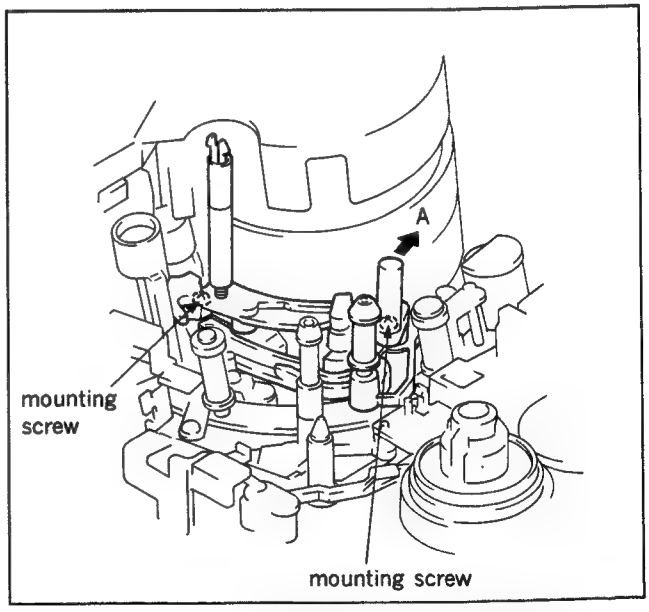


Fig. 4-11-3 Entrance guide (K) ass'y installation

4-12. SLANT GUIDE BLOCK REPLACEMENT

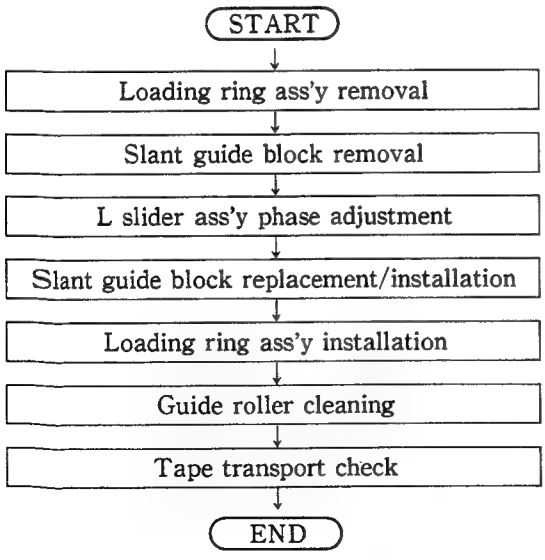
Basic Knowledge

A1) The slant guide block is replaced without removing the mechanical deck from the unit.
2) Remove the cassette compartment ass'y (refer to the procedure of Section 2-7).
3) Remove the No. 10 gear, then perform phase adjustment of the No. 10 gear.
4) Perform phase adjustment of the L slider ass'y when reinstalling the slant guide block.
5) The guide base ass'y on the slant guide block cannot be replaced as an individual part. If replacement is necessary, replace the entire whole slant guide block.

B Prepare the followings items for the replacement/adjustment.

- No. 10 gear phase adjustment tool:
  Sony part No. J-6257-610-A
- Mode selector
  Sony part No. J-6080-825-A
- Cleaning fluid
  Sony part No. Y-2031-001-1
- Wiping cloth
  Sony part No. 7-741-900-53

C Replacement flow chart



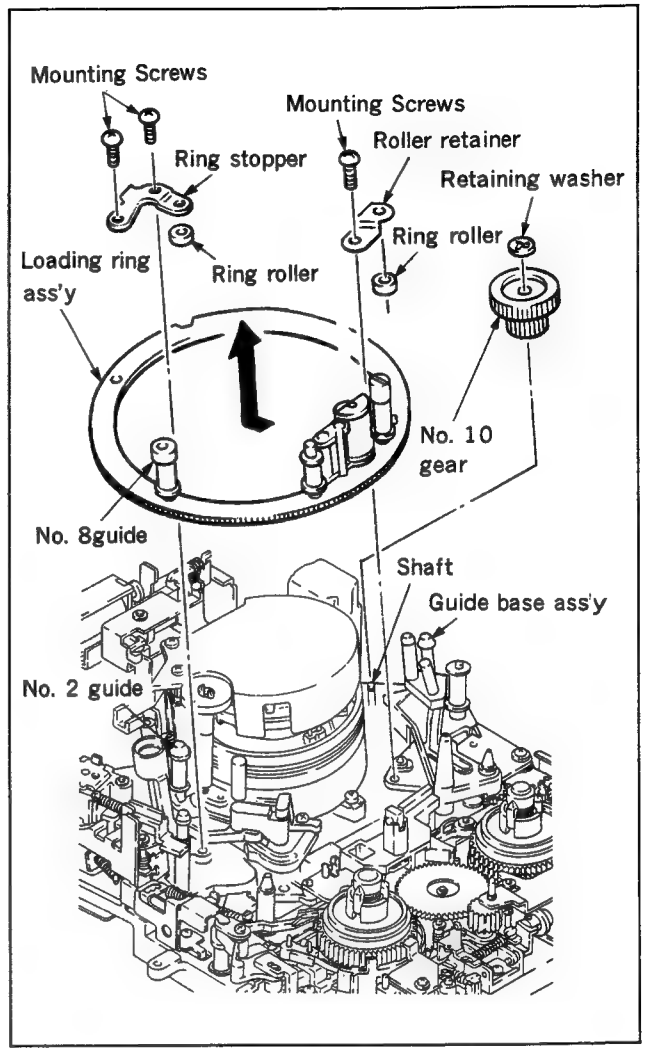


Fig. 4-12-1 Loading ring ass'y removal

Removal

1. Loading ring ass'y removal
   Remove the loading ring ass'y referring Section 4-4.

2. Slant guide block removal (Fig. 4-12-2)
   Remove the screw and the E ring securing the slant guide block. Remove the slant guide block.

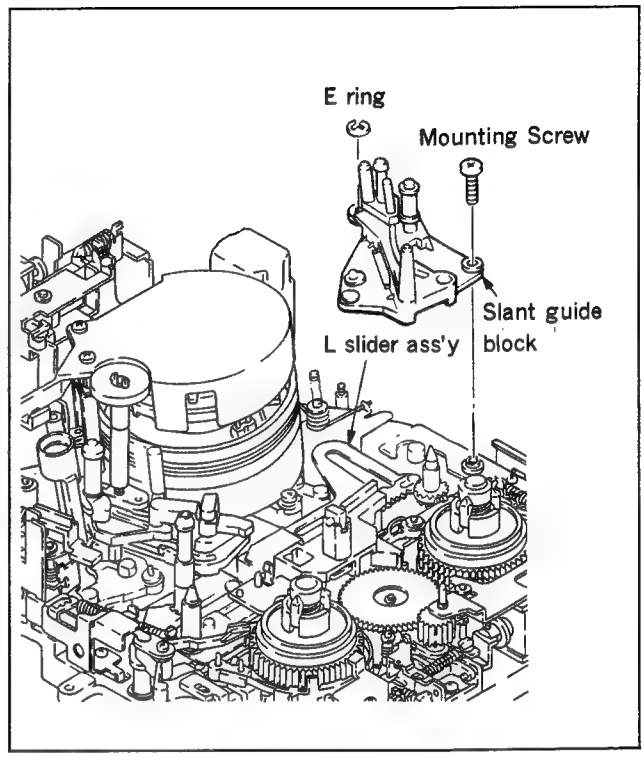


Fig. 4-12-2 Slant guide block removal

3. L slider ass'y phase adjustment (Fig. 4-12-3)
   Before installing the slant guide block, perform phase adjustment of the L slider ass'y.
   1) Press the L mode selector button of the mode selector, and align the right edge of the L slider ass'y with the right edge of the lock slider M ass'y.
   2) Confirm that the notch in the slant guide drive gear is located in the position shown in the figure.

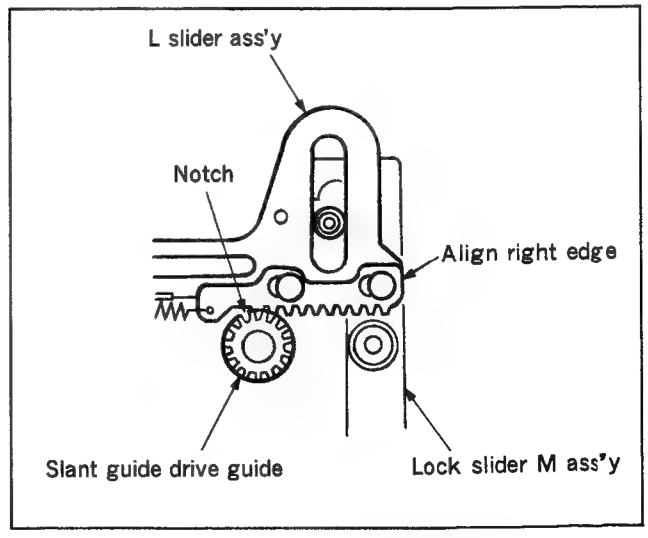


Fig. 4-12-3 L slider ass'y phase adjustment

4. Slant guide block replacement/installation
   1) Hold the guide base ass'y of the replacement slant guide block at the unthreaded end (i. e. guide base ass'y is positioned to the reel table side shown in the figure), then set it on the mechanical deck. (Fig. 4-12-4)
   2) Replace the E ring removed in step 2 with a new one, then install the slant guide block with this E ring and screw.

5. Loading ring ass'y installation
   1) Using the mode selector, put the guide base ass'y to the threading end position.

   2) Install the loading ring ass'y referring to Section 4-4.

   Note: When installing the No. 10 gear, replace the retaining washer with a new one, and use a new washer.

   3) Perform phase adjustment of the No. 10 gear referring to Section 4-4.

6. Guide rollers cleaning
   Clean the guide rollers on the loading ring and also each guide roller on the slant guide block, with a wiping cloth moistened with cleaning fluid. Be sure to wipe these rollers with a dry cloth two or three times.

7. Tape transport check
   Check the tape transport referring to Section 6.

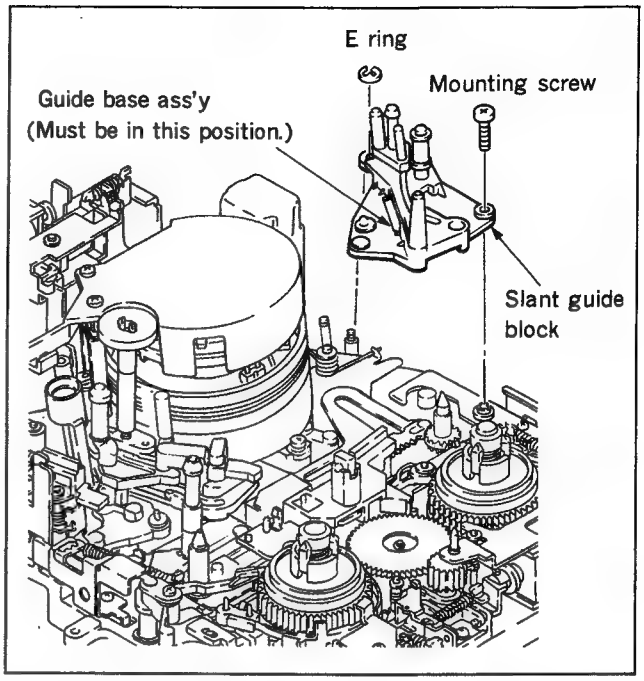


Fig. 4-12-4 Slant guide block replacement/installation

4-13. No. 5 GUIDE REPLACEMENT

Basic Knowledge

A No.5 guide can be replaced independently without removing other parts. But take utmost care not to damage cleaning roller ass'y because cleaning roller is very close to the No.5 guide.

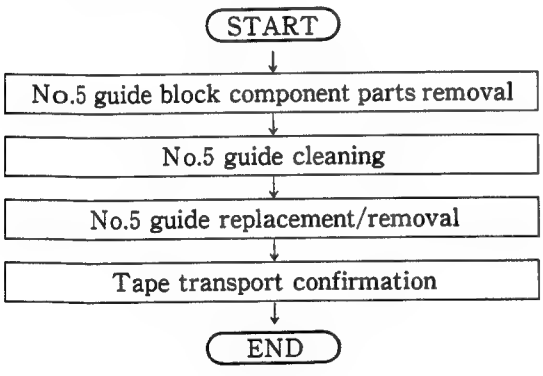
B If a pair of tweezers or a similar tool is used to install new No.5 guide, they can easily damage the surface of the guide. Please pay utmost attention.

C No.5 guide has already been adjusted of its zenith and azimuth when it is shipped from the factory. Do not touch base adjusting screw.

D Prepare the followings items for the replacement.

- Cleandng fluid:
  Sony part No.Y-2031-001-1
- Wiping cloth:
  Sony part No.7-741-900-53

E Replacement flow chart



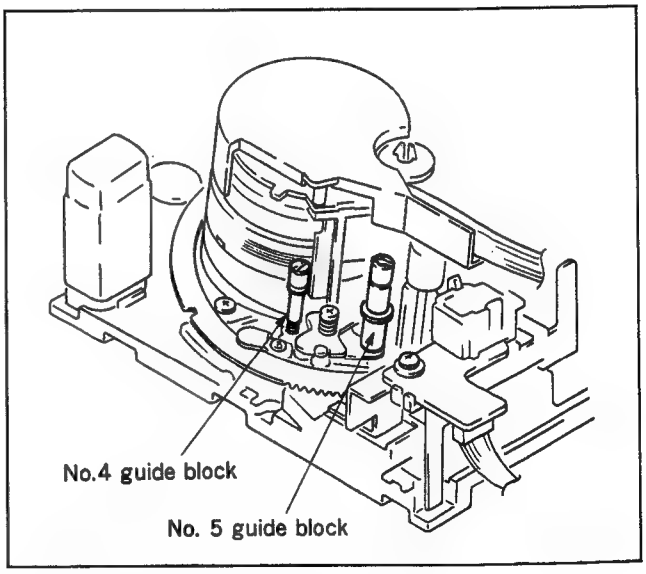


Fig. 4-13-1 No. 4, No. 5 guide block

Replacement Procedure

1. No.5 guide block component parts removal (Fig. 4-13-2)
   1) Remove guide nut, then guide boss, guide flange and No.5 guide are removed.
   2) Do not remove the compression spring but leave it in spindle.

2. No.5 guide cleaning
   Clean the No.5 guide and shaft with wiping cloth moistened with cleaning fluid. Be sure to wipe these parts with a dry cloth two or three times.

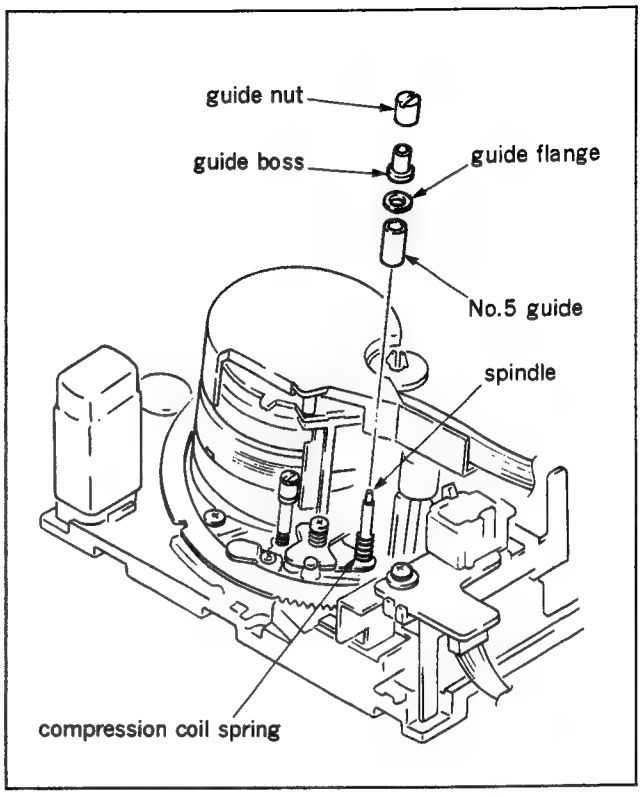


Fig. 4-13-2 No.5 guide replacement

3. No. 5 guide replacement/installation
   1) Install No.5 guide into the shaft.
   Top and bottom of No.5 guide are not the same. Do not make mistake to install the top end of No.5 guide to the bottom. (See Fig.4-13-3.)
   2) Install guide flange, guide boss in this order. Secure them with guide nut.

4. Tape transport confirmation
   Check tape transport according to Section 6-7.
   If the correct tape transport adjustment cannot be obtained, perform the tape exit side adjustment referring to Section 6.

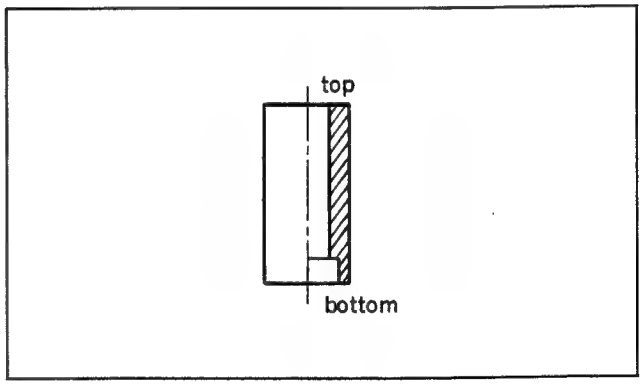


Fig. 4-13-3

4-14. S REEL TABLE ASS'Y REPLACEMENT

Basic Knowledge

A 1)First, remove the cassette compartment ass'y from the mechanical deck (refer to the procedure of Section 2-6).

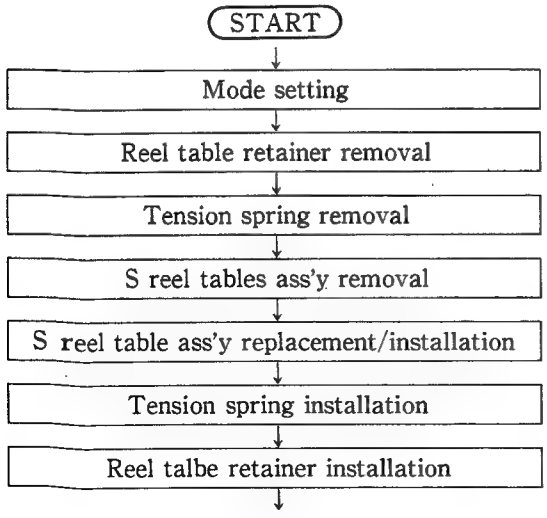
2)The S reel table ass'y is engaged with the S main brake ass'y, the hard brake S, tension regulator band ass'y, and so on. While moving these parts away from the S reel table, and then remove the S reel table ass'y.

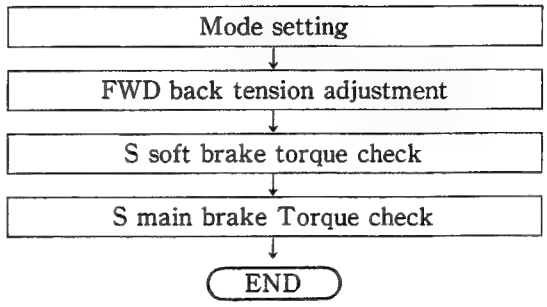
3)Grasp the upper reel claw of the new S reel table ass'y, while taking care not to touch the surface of the reel table that is facing against the tension regulator band, or the gears, then install the new S reel table ass'y.

B Prepare the followings items for the replacement

- Mode selector :
  Sony part No. J-6080-825-A
- Dial tension gauge :
  Sony part No. J-6080-827-A
- Tension measurement reels : (2pcs)
  Sony part No. J-6080-831-A
  No. J-6080-832-A
- Sony oil :
  Sony part No. 7-661-018-18

C Replacement flow chart





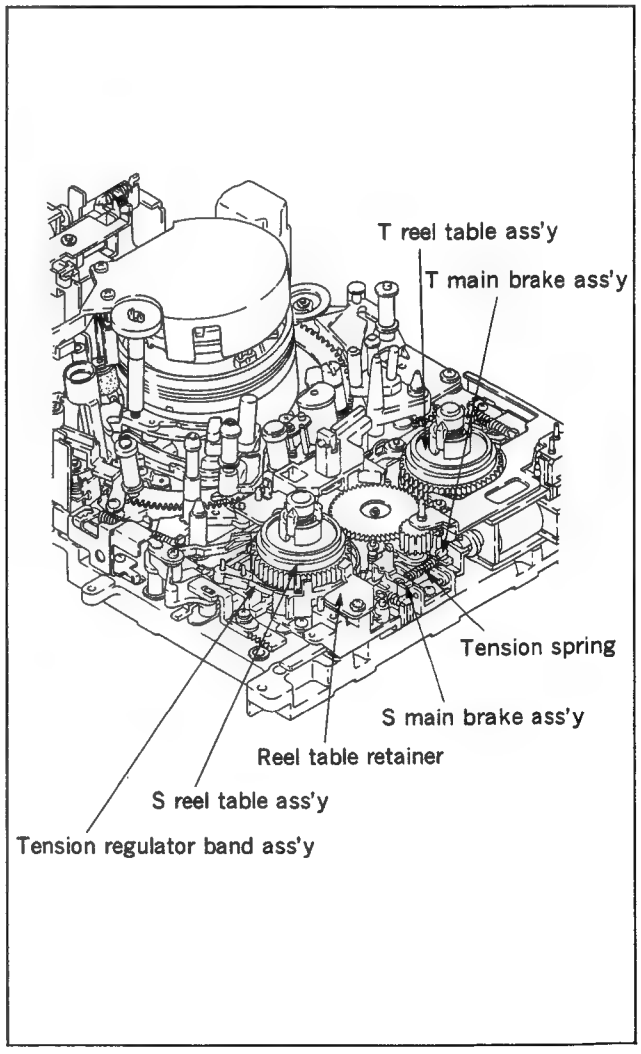


Fig. 4-14-1

Replacement Procedure

1. Mode setting
   Press the M mode selector button on the mode selector and enter the [FF/REW] mode.

2. Reel table retainer removal (Fig. 4-14-2)
   Remove the mounting screw, then remove the reel table retainer.

3. Tension spring removal (Fig. 4-14-2)
   Disengage the S side of the tension spring attached to the S/T main brake ass'y from the S main brake ass'y.
   Note: Handle the spring carefully so as not to deform it.

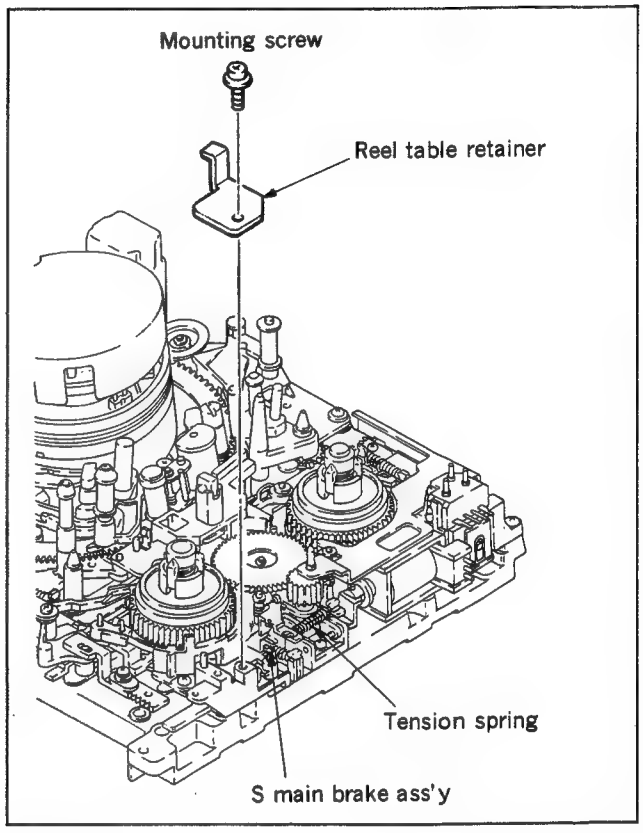


Fig. 4-14-2 Reel table retainer removal and tension spring removal.

4. S reel table ass'y removal (Fig. 4-12-3)
   1) Using a tweezers or a screwdriver, move the hard brake S in the direction of arrow A indicated in the figure.
   2) Grasp the upper reel claw of the S reel table ass'y with the fingers and raise it while pushing the hook of the tension regulator band in the direction of arrow B with the fingers of the other hand, pull out the S reel table ass'y in the upward direction.

5. S reel table ass'y removal and installation
   1) Apply 1/2 a drop of oil to the spherical face at the top of the reel shaft.

   2) Replace the S reel table ass'y with a new one, then refer to the above procedure of step 4, and insert the reel table ass'y onto the reel shaft. During this work, take care not to pinch the tension regular band ass'y.

6. Tension spring installation
   Re-attach the tension spring to the S main brake ass'y.

7. Reel table retainer installation
   Install the reel table retainer securely to the mechanical deck with the mounting screw, then install the S reel table ass'y.

8. Mode setting
   Press the M mode selector button of the mode selector and enter the LOADING/UNLOADING mode.

9. FWD back tension adjustment
   Whenever the replacement work has been completed, perform a tape FWD operation for at least two minutes, then proceed to FWD back tension adjustment.

10. S Soft brake : brake torque check
    Perform check referring to Section 5-2.

11. S. main brake : torque check.
    Perform check referring to Section 5-1.

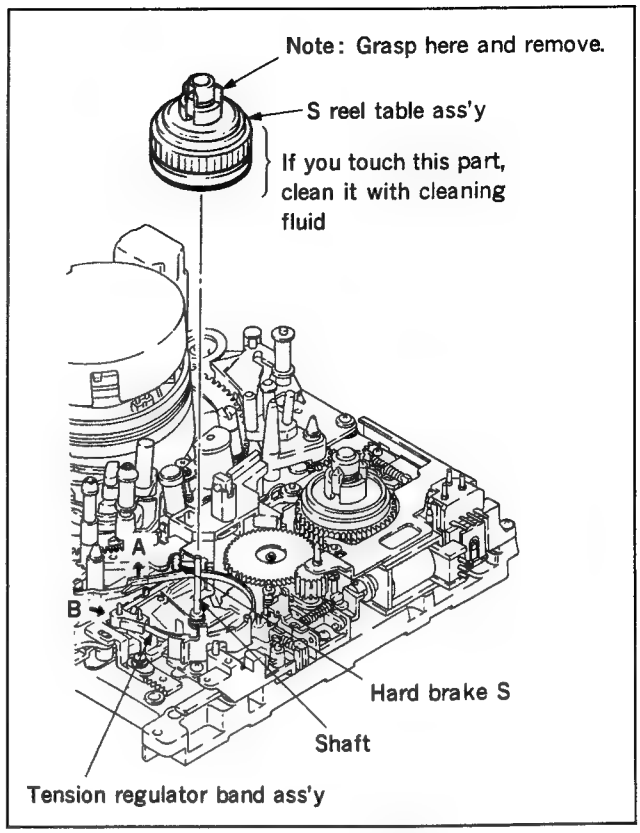


Fig. 4-14-3 S reel table ass'y replacement

4-15. T REEL TABLE ASS'Y REPLACEMENT

Basic Knowledge

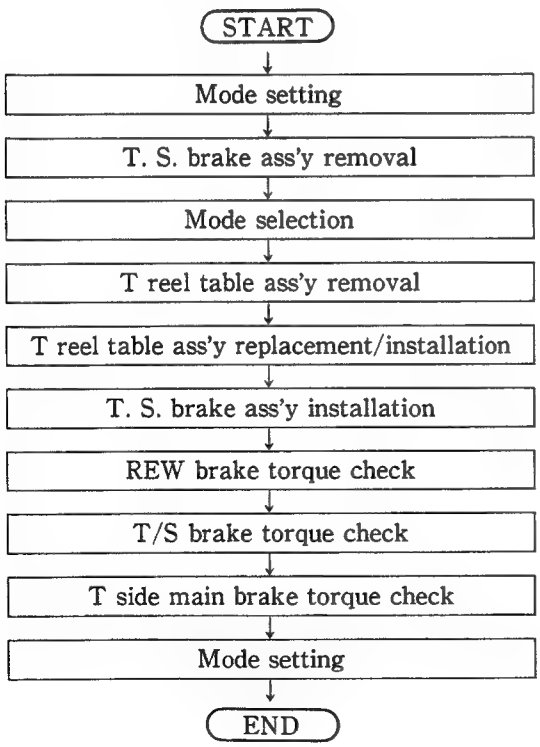
A When replacing the T reel table ass'y, first remove the cassette compartment ass'y (according to Section 2-7).

2) It is necessary to remove the T. S. brake ass'y before removing the T reel table ass'y. This involves delicate work in a small space, so be careful not to damage other parts.

B Prepare the followings items for the replacement

- Mode selector :
  Sony part No. J-6080-825-A
- Sony oil :
  Sony part No. 7-661-018-18
- Dial tension gauge :
  Sony part No. J-6080-827-A
- Tension measurment reel :
  Sony part No. J-6080-832-A.

C Replacement flow chart



REPLACEMENT PROCEDURES

1. Mode setting
   1) Press the L mode selector button of the mode selector and enter the [UNLOADING WAIT] mode.

2. Removing the T. S. brake ass'y
   1) Remove the tension spring hooked to the T. S. brake ass'y, and hook it to the claw of the lock slider M ass'y. (See detailed drawing of A part.)
   2) Remove the retaining washer fixing the T. S. brake ass'y.
   3) Remove the claw of the T. S. release arm that engage the T. S. brake ass'y, then remove the T. S. brake ass'y.

3. Mode selection
   Press the M mode selector button on the mode selector and enter the [EJECT] mode.

4. T reel table ass'y removal
   Pull the T reel table ass'y out from the shaft while pushing the drive gear B ass'y with the fingers in the direction of arrow C.

5. T reel table ass'y replacement/installation
   1) Apply 1/2 a drop of oil to the spherical surface at the top of the reel shaft.
   2) Replace the T reel table ass'y with a new one, then push the drive gear B ass'y in the C direction indicated by the arrow, and install the T reel table ass'y on the reel shaft. (Confirm that the mode selector is in the [EJECT] mode.)

6. T. S. brake ass'y installation
   1) Engage the T. S. brake ass'y onto the claw of the T. S. release arm, then install the T. S. brake ass'y using a new retaining washer.
   2) Unhook the spring hooked to the lock slider M ass'y, and hook it to the T. S. brake ass'y.

7. REW brake torque check
   Perform the check referring to Section 5-3.

8. T/S brake torgue check
   Perform the check referring to Section 2-2-2.

9. T side main brake torque check
   Perform the check referring to Section 5-1-2.

10. Mode setting
    Press the mode selector L mode selector button and enter the [LOADING TOP] mode, then press the M mode selector button and enter the [LOADING/UNLOADING] mode.

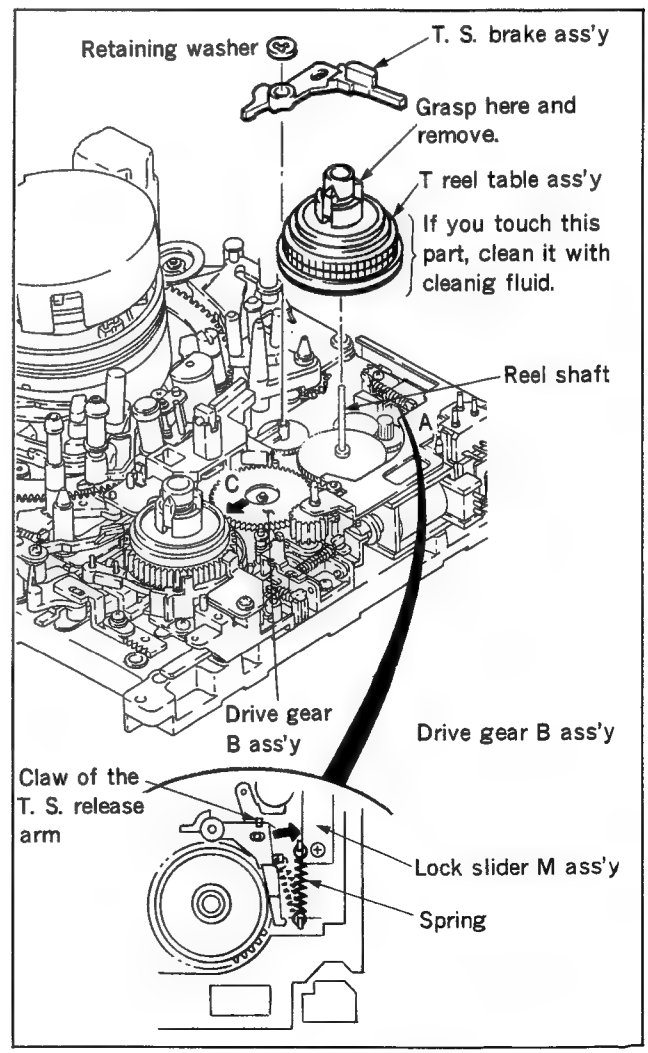


Fig. 4-15 T reel table ass'y replacement

4-16. PINCH PRESSURE ARM ASS'Y REPLACEMENT

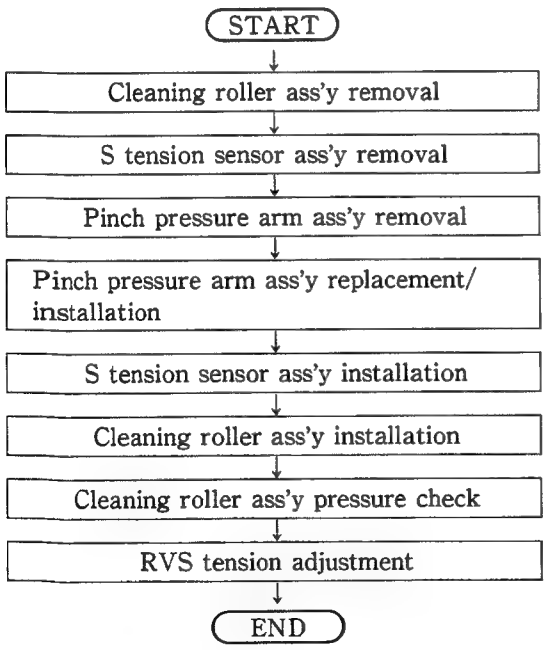
Basic Knowledge

A Although the pinch pressure arm ass'y can be replaced without removing the cassette compartment ass'y, it is recommended that you remove the cassette compartment ass'y before carrying out replacement work, to facilitate replacement work and also to prevent damaging the parts of the cassette compartment ass'y. (refer to the procedure of Section 2-7.)

B As can be seen in Fig. 4-16-1, the pinch pressure arm ass'y is located at the back of other parts, hence it is necessary to remove these other parts before the pinch pressure arm replacement. Take care not to lose or damage these parts.

C Prepare the followings item for the replacement
- Sony oil :
  Sony part No. 7-661-018-18
- FWD/RVS rewind torque cassette :
  Sony part No. : J-6080-824-A

D Replacement flow chart



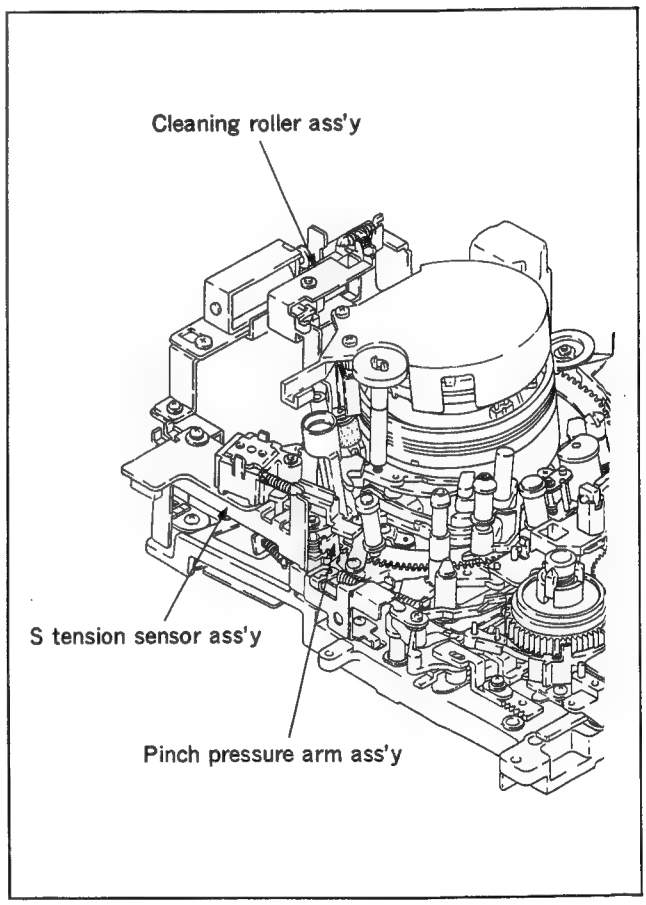


Fig. 4-16-1 Pinch pressure arm ass'y replacement

Replacement Procedure

1. Cleaning roller ass'y removal (Fig. 4-16-2)
   Remove the two mounting screws, then remove the cleaning roller ass'y.

2. S tension sensor ass'y removal (Fig. 4-16-2)
   1) Disconnect the connector of the TR-72 board that is connected to the CN-551 board.
   2) Remove the mounting screw, then remove the S tension sensor ass'y.

   Note: When removing the S tension sensor ass'y, the notched part shown in the figure is attached to the tension regulator spring attachment ass'y, the edge of the S tension sensor ass'y must be pushed against the leaf spring shown in the figure, so take care not to damage the leaf spring.

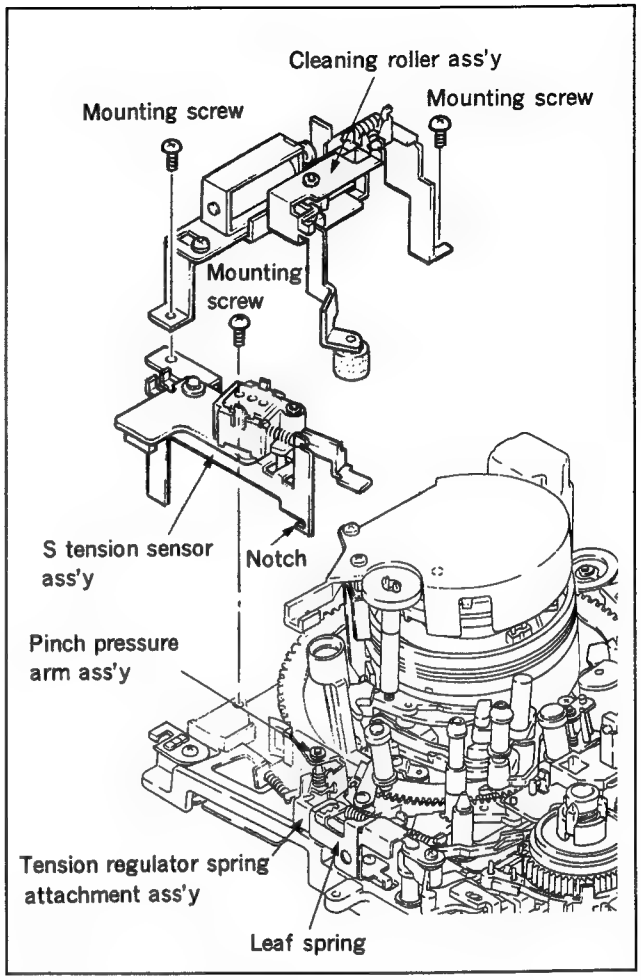


Fig. 4-16-2 Removing the cleaning roller ass'y and the S. tension sensor ass'y

3. Pinch pressure arm ass'y removal (Fig. 4-16-3)
   1) Unhook the spring that is hooked to the tension regulator spring attachment ass'y, and re-hook it to the pinch pressure arm ass'y. (See detailed drawing.)
   2) Remove the retaining washer from the shaft, then remove the pinch pressure arm ass'y.

4. Pinch pressure arm ass'y replacement/installation
   1) Apply 1/2 a drop of oil to the shaft.
   2) Replace the pinch pressure arm ass'y with a new one.
   3) Install the pinch pressure arm ass'y in the reverse order to step 3.

5. S tension sensor ass'y installation

6. Cleaning roller ass'y installation

Perform steps 5 and 6 by reversing the steps 1 and 2.

7. Cleaning roller ass'y pressure check
   Refer to item 11 of Section 4-5-1, then check the pressure force.
   If the pressure does not satisfy the specification, perform adjustment using the procedure described in Section 4-5-1.

8. RVS tension adjustment
   Perform adjustment according to Section 5-4.

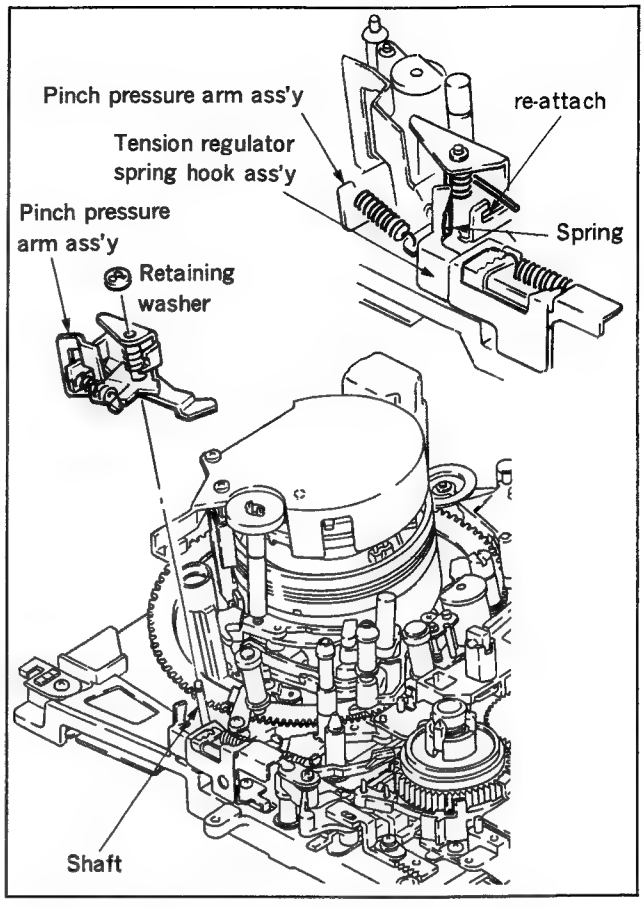


Fig. 4-16-3 Pinch pressure arm ass'y removal

4-17. TENSION REGULATOR ARM ASS'Y REPLACEMENT

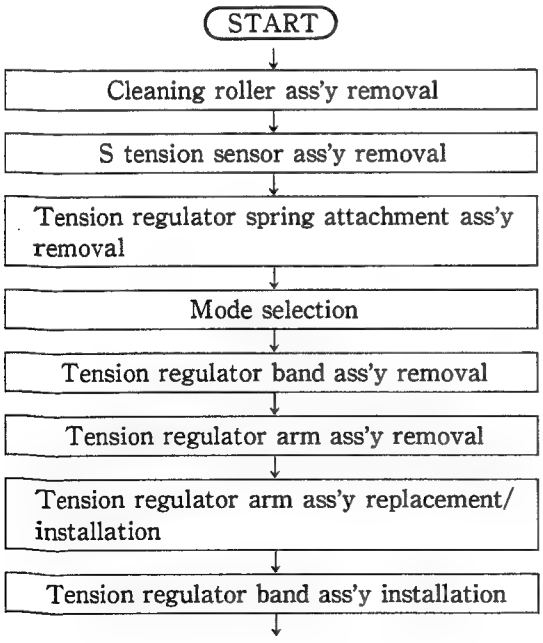
Basic Knowledge

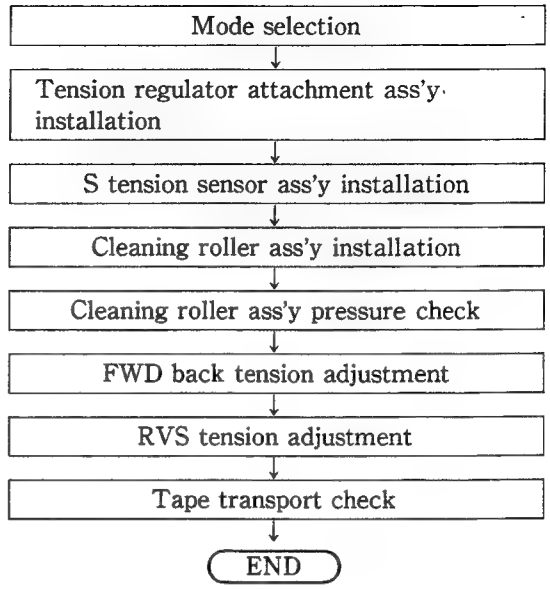
A To replace the tension regulator arm ass'y, first remove the cassette compartment ass'y (according to Section 2-7).

B This replacement work necessitates removal of other parts (cleaning roller ass'y, S tension sensor and tension regulator spring attachment ass'y). Take care not to lose or damage these parts after removing them.

C Prepare the following items for the replacement.
- Mode selector :
  Sony part No. J-6080-825-A
- Sony oil :
  Sony part No. 7-661-018-18
- Screw locking compound :
  Sony part No. 7-432-114-11 (Three Bond 1401B)
- FWD/RVS rewind torque cassette :
  Sony part No. : J-6080-824-A
- Dial tension gauge :
  Sony part No. J-6080-827-A.
- Tension measurement reel :
  Sony part No. J-6080-831-A.

D Replacement flow chart





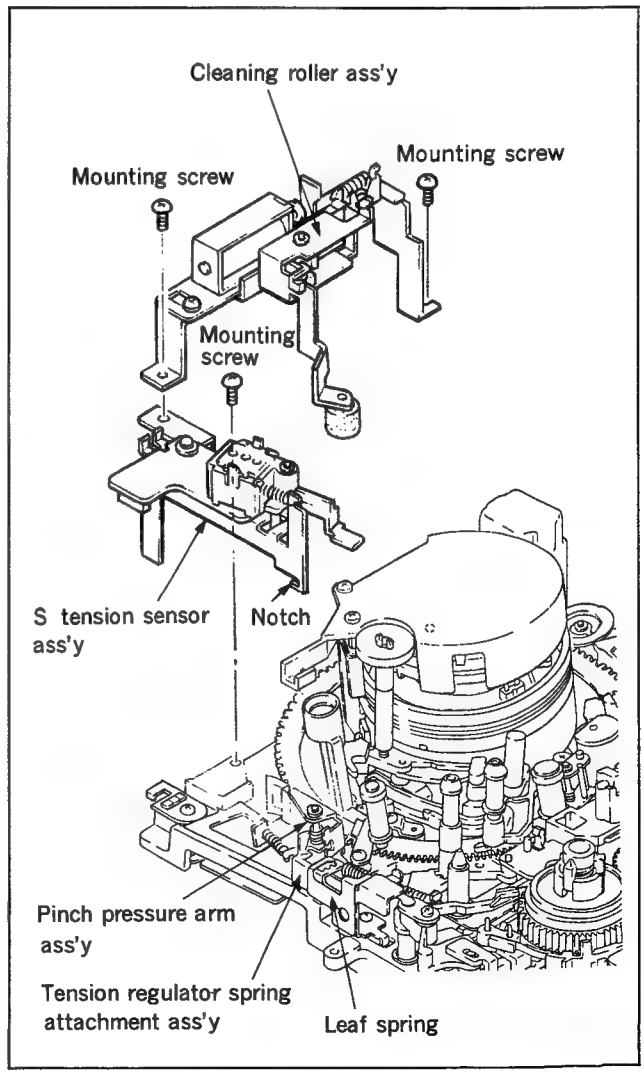


Fig. 4-17-1

Replacement Procedure

1. Cleaning roller ass'y removal
   Remove the cleaning roller referring to Section 4-16.

2. S tension sensor ass'y removal
   Remove the S tension sensor ass'y referring to Section 4-16.

3. Tension regulator spring attachment ass'y removal (Fig. 4-17-2)
   1) Unhook the tension spring that is hooked to the tension regulator arm ass'y from the tension regulator spring attachment ass'y. (Make a note of the exact point to which the spring was hooked.)

   2) Remove the mounting screw, then remove the tension regulator spring attachment ass'y.

4. Mode selection
   Press the M mode selector button of the mode selector and enter the FF/REW mode.

5. Tension regulator band ass'y removal
   Remove the claw of the tension regular band ass'y attached to the tension regulator arm ass'y, then remove the tension regulator band ass'y from the tension regulator arm ass'y. (Refer to details described in Section 4-17-2.)

6. Tension regulator arm ass'y removal
   Remove the tension regulator arm ass'y from the shaft shown in the figure.

7. Tension regulator arm ass'y replacement/installation
   1) Replace the tension regulator arm ass'y with a new one.
   2) Apply 1/2 a drop of oil to the end of the shaft.
   3) Align the tension regulator arm ass'y with the shaft, then install it on the shaft. During this work, align the pin of the tension regulator load arm ass'y (see drawing) with the cam groove, and insert it into the groove.

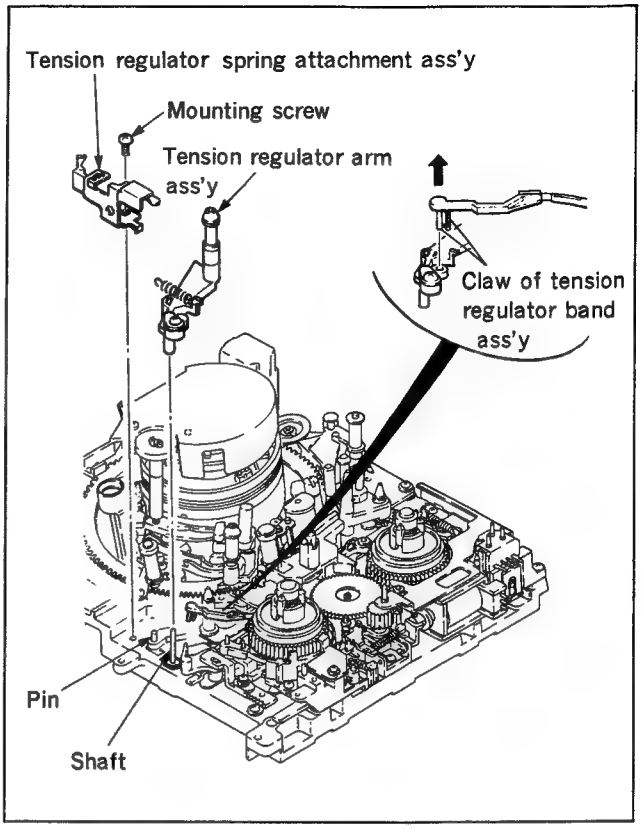


Fig. 4-17-2 Tension regulator arm ass'y replacement

8. Tension regulator band ass'y installation
   Install the tension regulator band ass'y on the tension regulator arm ass'y.
   Note: Do not touch the inside of the band with the fingers.
   Also, do not deform the band.

9. Mode selection
   Press the M mode selector button of the mode selector and enter the LOADING/UNLOADING mode.

10. Tension regulator spring attachment ass'y installation

11. S tension sensor ass'y installation

12. Cleaning roller ass'y installation

1) Carry out steps 10, 11 and 12 above, by reversing the steps 1, 2 and 3.
2) Apply screw lock compound to the periphery of the head of the mounting screws.

13. Cleaning roller ass'y pressure check
    Refer to item 11 of Section 4-5-1, then perform a pressure check. If the specification does not satisfy the specification perform adjustment referring to this Section 4-5-1.

14. FWD back tension adjustment
    Adjust the FWD back tension referring to Section 5-5.

15. RVS tension adjustment
    Perform adjustment referring to Section 5-4

16. Tape transport check
    Perform a tape transport check referring to Section 6-6.
    If not to meet the specification, perform the entrance side tape transport adjustment referring to Section 6.

4-18. TENSION REGULATOR BAND ASS'Y REPLACEMENT

Basic Knowledge

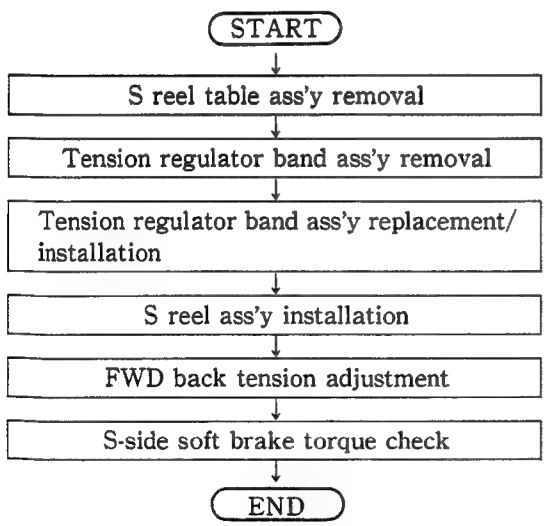
A To replace the tension regulator band ass'y, first remove the cassette compartment ass'y (referring to Section 2-7).

B After replacing the tension regulator band ass'y, perform FWD back tension adjustment.

C Prepare the following items for the replacement.

- Mode selector :
  Sony part No. J-6080-825-A
- Dial tension gauge :
  Sony part No. J-6080-827-A
- Tension measurement reels :
  Sony part No. { J-6080-831-A / J-6080-832-A }
- Cassette tape

D Replacement flow chart



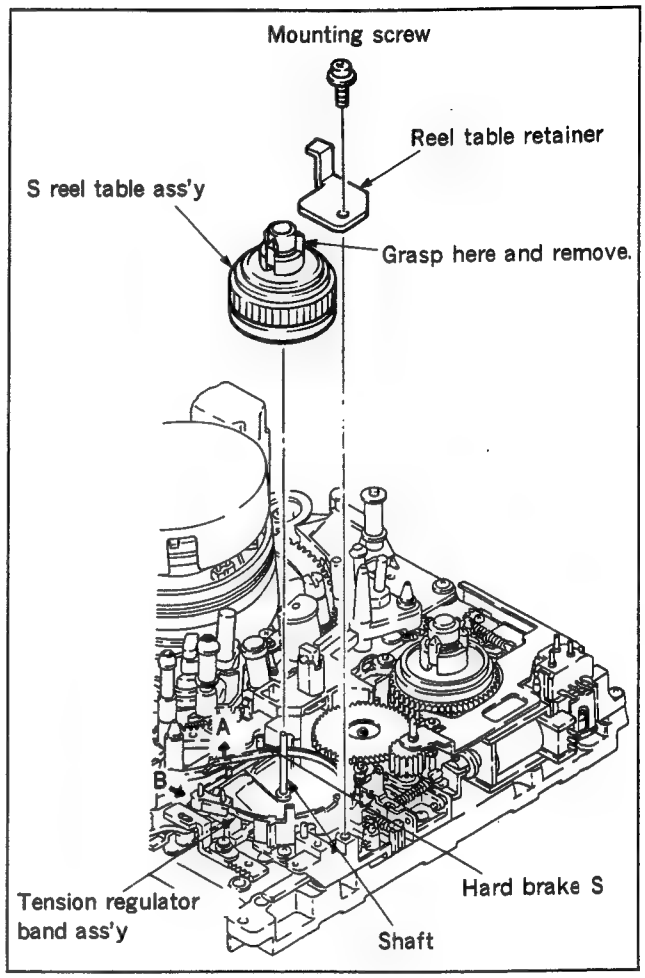


Fig. 4-18-1 Removing the S reel table ass'y

Replacement Procedure

1. S reel table ass'y removal (Fig. 4-18-1)
   Remove the S reel table ass'y referring to Section 4-14.

2. Tension regulator band ass'y removal
   1) Release the claw of the band arm shown in Fig. 4-18-2, then remove one side of the tension regulator band ass'y.
   2) Detach the claw from the tension regulator arm ass'y (see figure for details), then remove the tension regulator band ass'y.

3. Tension regulator band ass'y replacement/installation
   1) Replace the tension regulator band ass'y with a new one.
   2) Install the tension regalator band by reversing the step 2.

   Note: Never touch the inside of the band with the fingers, and do not deform the band.

4. Installing the S reel table ass'y
   Install the S reel table ass'y referring to Section 4-14.

5. FWD back tension adjustment
   Perform the FWD back tension adjustment referring to Section 5-5.

6. S side soft brake torque check check
   Check the brake torque referring to Section 5-2-1.

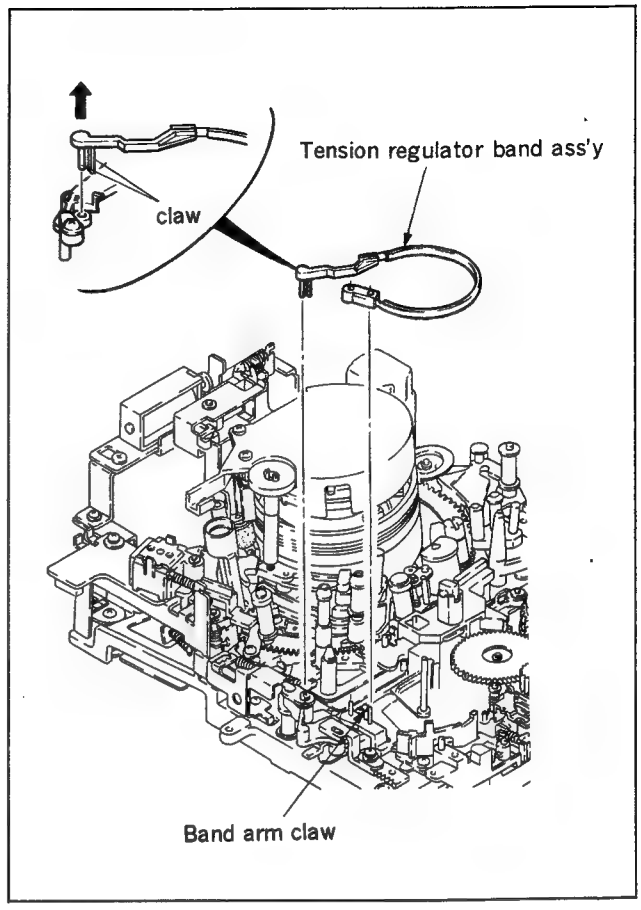


Fig. 4-18-2 Tension regulator band ass'y replacement

4-19. L SLIDER ASS'Y REPLACEMENT

Basic Knowledge

A To replace L slider ass'y, it is necessary first to remove many ass'ys. Take care not to lose or damage the removed parts.

B L slider ass'y is coated with grease. When replacing it, be sure that grease does not get on the drum ass'y or guide rollers.
After installing a new L slider ass'y, coat it with grease. Next, wash your hands clean with detergent, then install the remaining parts.

C Before installing tape transport parts of each ass'y, clean them with wiping cloth moistened with cleaning fluid, then be sure to wipe them with a dry cloth two or three times.

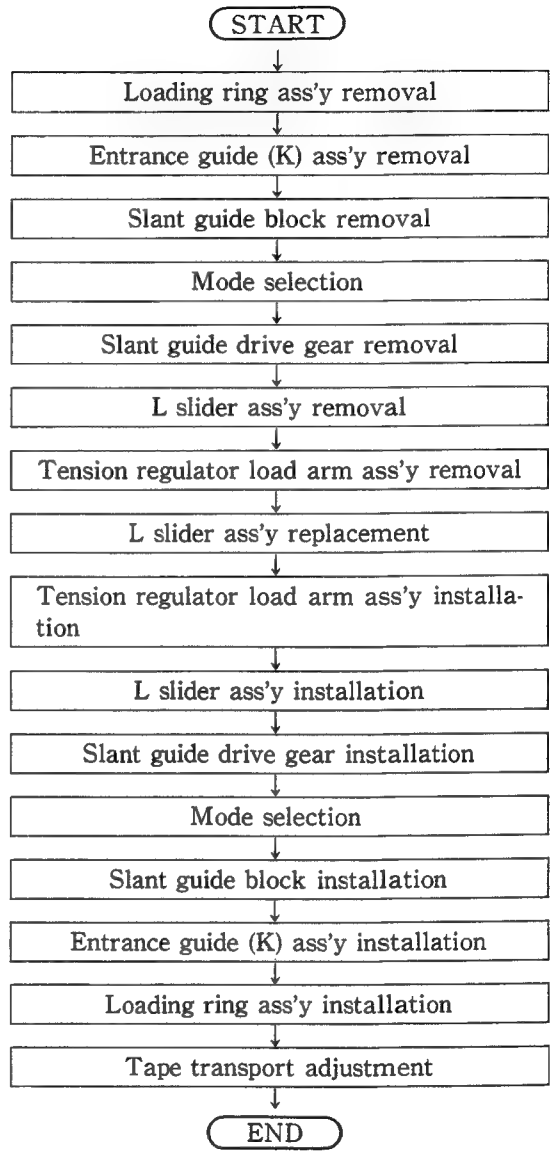
D Refer to Section 4-17 item 3 for details to remove L slider ass'y. This work can be facilitated by first removing the tension spring to enable tension regulator arm ass'y to move freely. Before removing each part, carefully observe its relation with other parts.

E Align phase of No.10 gear after installing it.

F Prepare the following items for replacement.

- Mode selector :
  Sony part No. J-6080-825-A
- Wiping cloth :
  Sony part No. 7-741-900-53
- Cleaning fluid :
  Sony part No. Y-2031-001-1
- Sony grease :
  Sony part No. 7-662-001-62
- Sony oil :
  Sony part No. 7-661-018-18
- No.10 gear phase alignment tool :
  Sony part No. J-6257-610-A

G Replacement flow chart



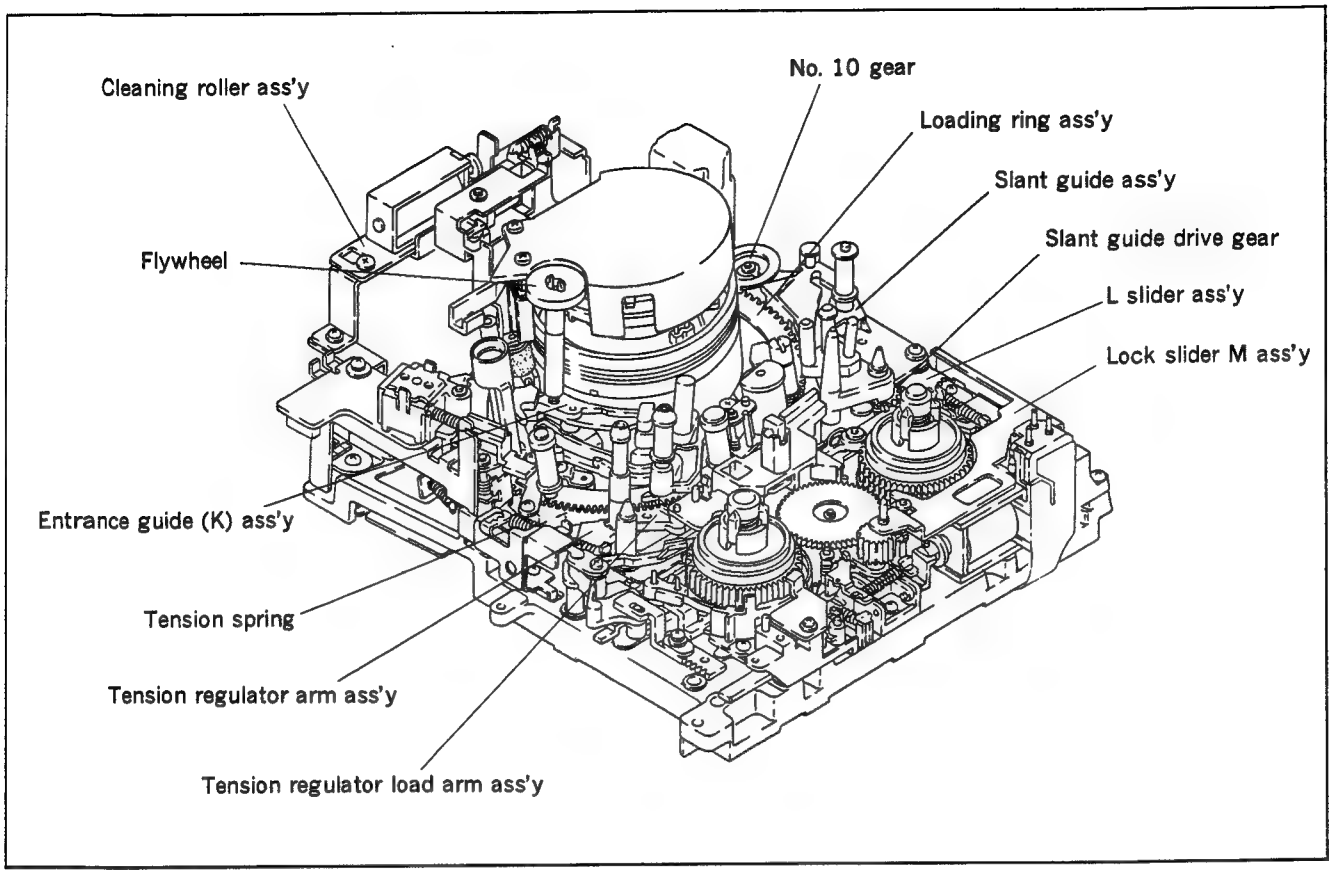


Fig. 4-19-1 Related parts Procedure

Replacement Procedure

1. Loading ring ass'y removal
   Remove loading ring ass'y referring to Section 4-4.
   (Be careful of the threading position.)
2. Entrance guide (K) ass'y removal
   Remove entrance guide (K) ass'y referring to Section 4-11. (Be careful of the threading position.)
3. Slant guide block removal
   Remove slant guide block referring to Section 4-12.
4. Mode selection
   Press L mode select button of the mode selector and enter into [DRUM START] mode.

5. Slant guide drive gear removal
Remove slant guide drive gear. (Refer to Fig.1.)

6. L slider ass'y removal.
1) Remove two retaining washers securing L slider ass'y.
2) While pushing protrusion of RL arm in the direction of arrow A as shown in Fig.1, raise the right side of L slider ass'y.
3) Next, press protrusion of B release slider in the direction of arrow B, and remove L slider ass'y. Next, remove pin of tension regulator load arm ass'y from cam groove at the back of the tension regulator ass'y, then remove L slider ass'y.

7. Tension regulator load arm ass'y removal
Remove retaining washer, then remove tension regulator load arm ass'y from L slider ass'y. (Refer to Fig.1.)

8. L slider ass'y replacement
Replace L slider ass'y with a new one, then smear grease to three oblong holes. (Refer to Fig.3.)

9. Tension regulator load arm ass'y installation
Install the tension regulator load arm ass'y into L slider ass'y.

10. L slider ass'y installation

11. Slant guide drive gear installation

For steps 9, 10 and 11, install the components by reversing steps 5, 6 and 7.

Notes : 1. Replace the retaining washer with a new one.

2. When inserting the pin of the tension regulator load arm ass'y into cam groove of tension regulator arm ass'y, insert the pin on the opposite side into the groove M slider.

12. Mode selection
Press L mode select button of mode selector, and align the right edge of L slider ass'y with the right edge of the lock slider M ass'y. (Refer to Fig.4.)

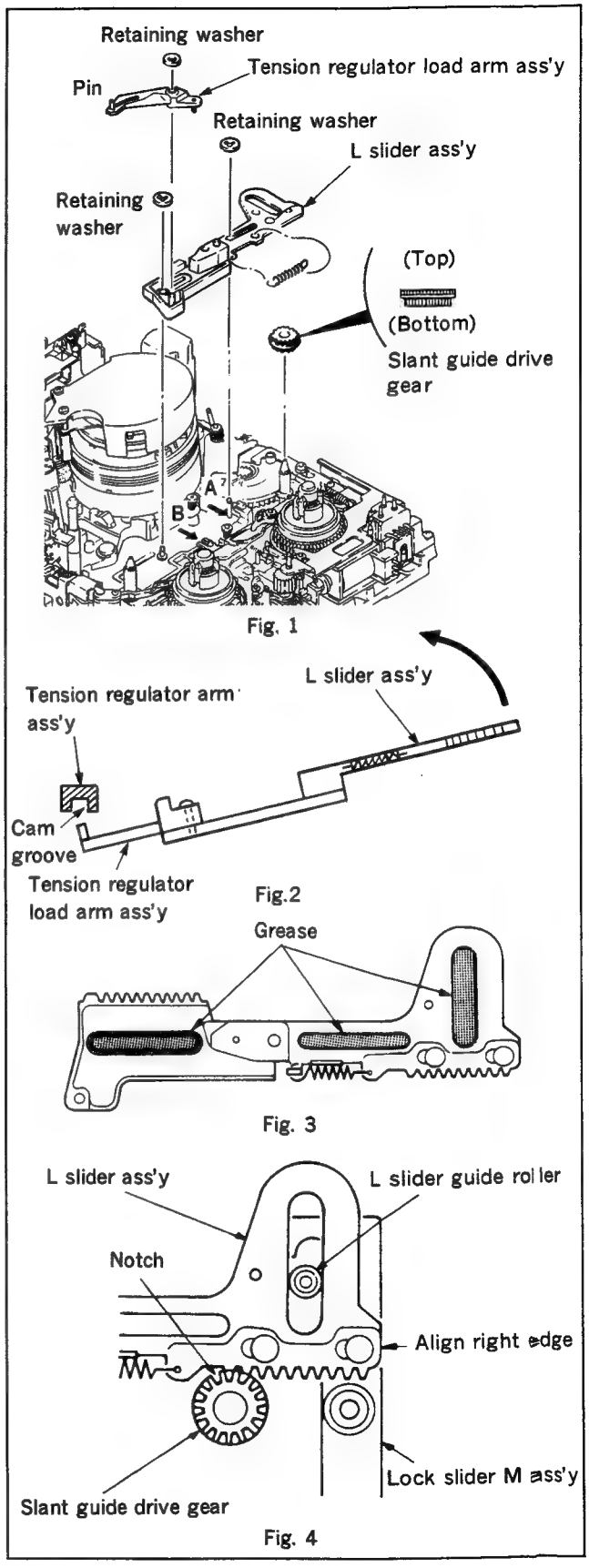


Fig. 4-19-2 L slider ass'y replacement

13. Slant guide block installation

14. Entrance guide (K) ass'y installation

15. Loading ring ass'y installation

For above steps 13, 14 and 15, install components by reversing steps 1, 2 and 3.

16. Tape transport adjustment
    Perform tape transport adjustment referring to Section 6.

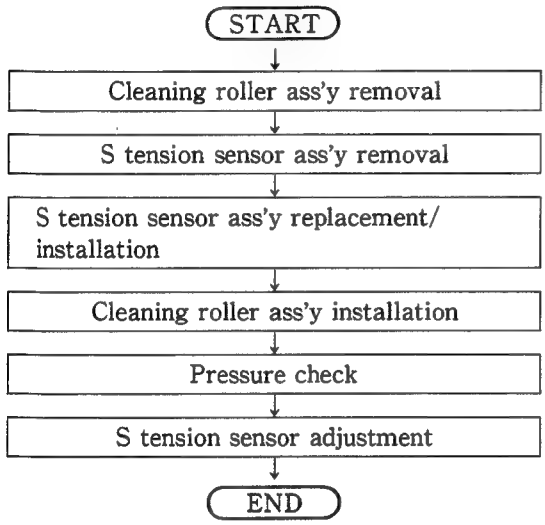
4-20. S TENSION SENSOR ASS'Y REPLACEMENT

Basic Knowledge

A Adjust S tension sensor after replacing S tension sensor ass'y.

B If cleaning roller ass'y has been removed, check pressure after re-installing cleaning roller ass'y.

C Replacement flow chart



Replacement Procedure

1. Cleaning roller ass'y removal
   Remove cleaning roller ass'y referring to Section 4-5.

2. S tension sensor ass'y removal
   1) Disconnect connector of TR-72 board from CN-551 board.

   2) Remove mounting screw, then remove S tension sensor ass'y.

Note : The notched part of S tension sensor shown in the figure is attached to tension regulator spring attachment ass'y. When removing S tension sensor ass'y, take care not to damage leaf spring because when the notched part of S tension sensor is detached the end of S tension sensor ass'y will be pressed against the end of leaf spring.

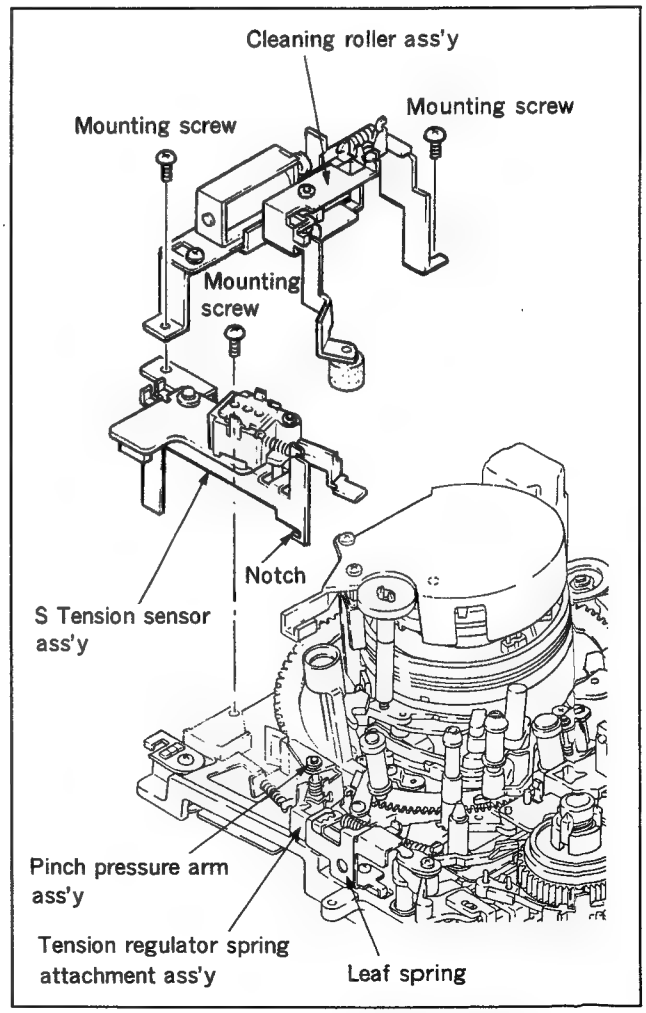


Fig. 4-20 S tension sensor ass'y replacement

3. S tension sensor ass'y replacement/installation
   1) Replace S tension sensor ass'y with a new one.

   2) Install a new S tension sensor ass'y by reversing step 2.

4. Cleaning roller ass'y installation
   Install cleaning roller ass'y referring to Section 4-5.

5. Pressure check
   Perform pressure check referring to item 11 of Section 4-5-1. If specification should not be met, perform adjustment according to Section 4-5-1.

6. S tension sensor adjustment
   Perform adjustment referring to Section 5-6.

4-21. L SWITCH ASS'Y REPLACEMENT

Basic Knowledge

A To replace L switch ass'y, it is necessary to first remove many ass'y parts. Take care not to lose or damage the removed parts.

B Various components are coated with oil and grease. When replacing L switch ass'y, be sure that oil or grease does not get on drum ass'y or guide rollers.

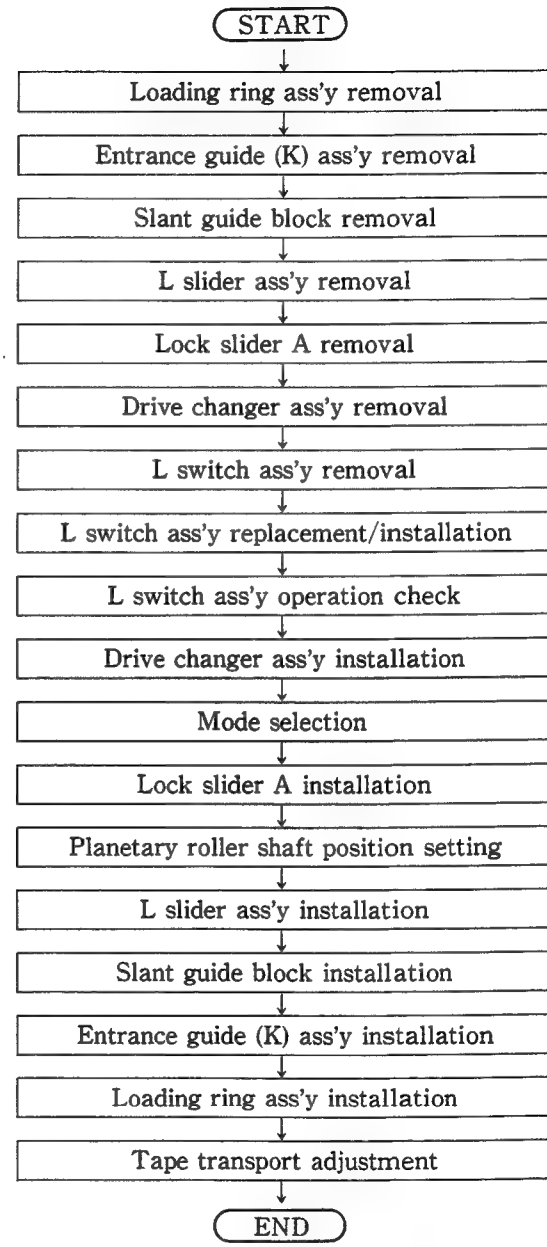
C Before installing the tape transport parts of each ass'y, clean them with wiping cloth moistened with cleaning fluid, then be sure to wipe them with a dry cloth two or three times.

D When replacing L switch ass'y, first remove cassette compartment ass'y referring to the procedure of Section 2-7.

E Prepare the following items for the replacement.

- Mode selector :
  Sony part No. J-6080-825-A
- No.10 gear phase alignment tool :
  Sony part No. J-6257-610-A
- Wiping cloth :
  Sony part No. 7-741-900-53
- Cleaning fluid :
  Sony part No. Y-2031-001-1
- Sony grease :
  Sony part No. 7-662-001-62
- Sony oil :
  Sony part No. 7-661-018-18

F Replacement flow chart



Replacement Procedure

1. Loading ring ass'y removal
   Remove loading ring ass'y referring to Section 4-4. (Be careful of the threading position.)

2. Entrance guide (K) ass'y removal
   Remove entrance guide (K) ass'y referring to Section 4-11. (Be careful of the threading position.)

3. Slant guide block removal
   Remove slant guide block referring to Section 4-12.

4. L slider ass'y removal
   Remove the L slider ass'y referring to Section 4-19.

5. Lock slider A removal (Fig.4-21-1)
   1) Remove lock slider retainer.

   2) Unhook the tension spring of the lock slider A side of the tension spring that is hooked to C motor cover M and lock slider A.

   3) Remove mounting screw fixing lock slider A, then remove lock slider A.

6. Drive changer ass'y removal (Fig.4-21-1)

   1) Remove retaining washer from the shaft of drive changer ass'y, then remove torsion spring.

   2) Remove drive changer ass'y from the shaft.

7. L switch ass'y removal

   1) Disconnect the connector (6P) from LM-22 board of L switch ass'y.

   2) Remove two mounting screws of L switch ass'y, then remove L switch ass'y.

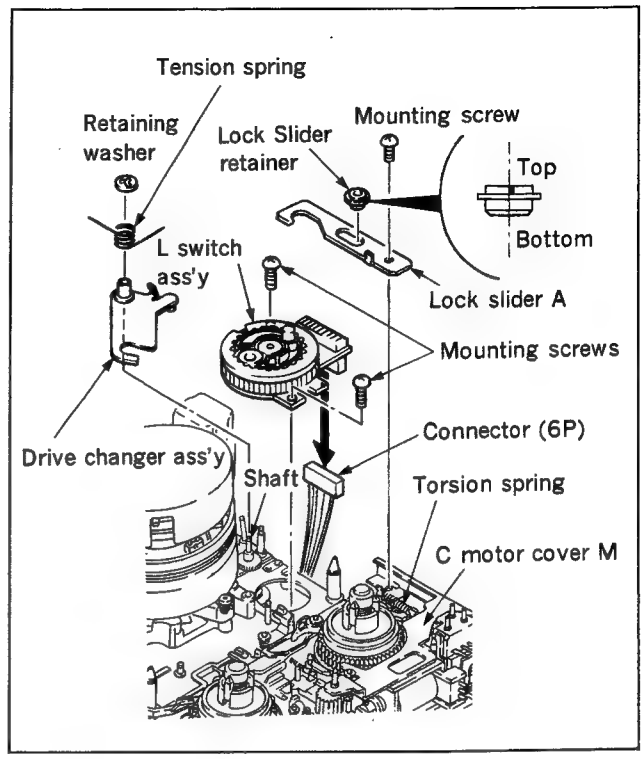


Fig. 4-21-1 L switch ass'y removal

8. L switch ass'y replacement/installation
   1) Replace L switch ass'y with a new one.

   2) Apply 1/2 a drop of oil to the planetary roller shaft shown in Fig.4-21-2.

   3) Install a new L switch ass'y with two mounting screws.

   4) Connect the connector (6P) to LM-22 board.

9. L switch ass'y operation check
   Press either left or right L mode select button of mode selector, and confirm that L switch ass'y rotates.

10. Drive changer ass'y installation

   1) Apply 1/2 a drop of oil to the shaft of the drive changer ass'y.

   2) Smear grease in the U groove of drive changer ass'y. (Fig.1)

   3) Install drive changer ass'y onto shaft.

   4) Install torsion spring on shaft, then fix it with retaining washer.

   5) Attach torsion spring to attachment part of drive changer ass'y and also to the No.9 gear shaft.

11. L switch ass'y operation check
   Press either left or right L mode select button of mode selector, and confirm that L switch ass'y rotates.

12. Lock slider A installation
   Install lock slider A by reversing step 5.

13. Planetary roller shaft position setting
   Press either left or right L mode select button of mode selector, and set the planetary roller shaft in the position shown in Fig.2.

14. L slider ass'y installation

15. Slant guide block installation

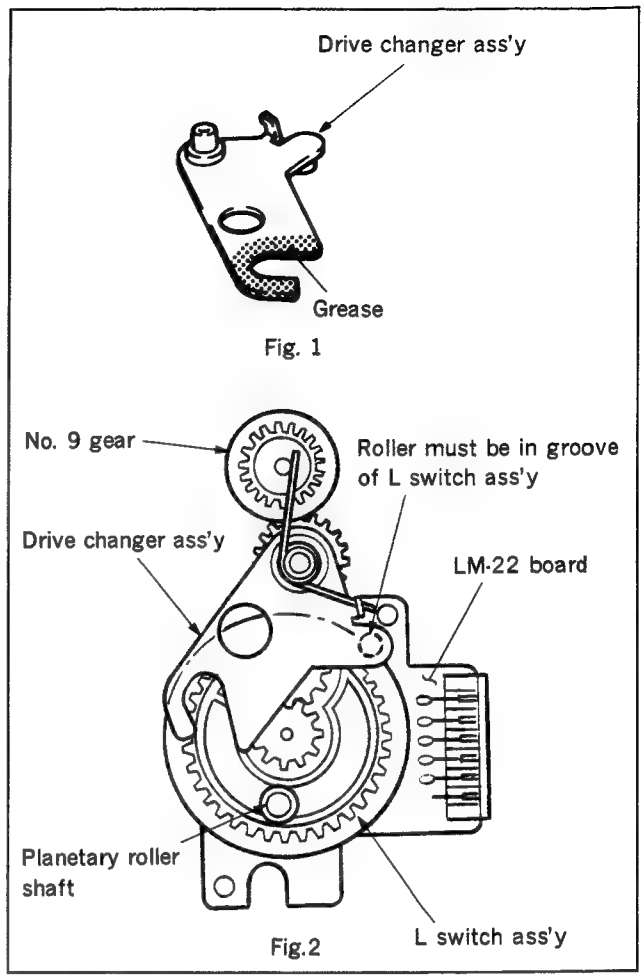


Fig. 4-21-2 L switch ass'y installation

16. Entrance guide (K) ass'y installation

17. Loading ring ass'y installation

For above steps 14, 15, 16 and 17, install components by reversing steps 1, 2, 3 and 4.

18. Tape transport adjustment
    Perform tape transport adjustment referring to Section 6.

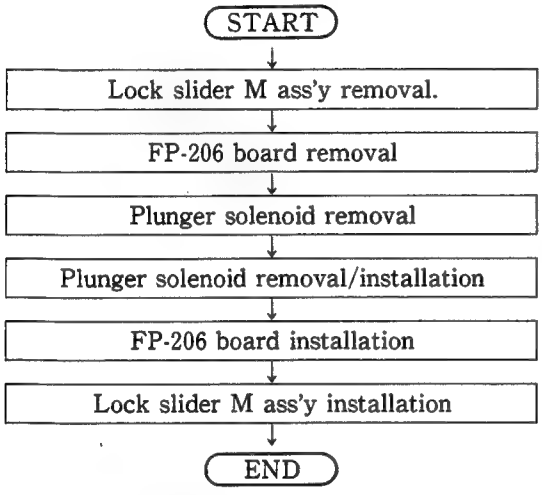
4-22. PLUNGER SOLENOID REPLACEMENT

Basic Knowledge

A Replacement of this part uses the soldering irow, Mechanical deck must be removed from the unit. Remove the mechanical deck referring to Section 2-6.

B Remove cassette compartment ass'y referring to Section 2-7.

C Replacement flow chart



Replacement Procedure

1. Lock slider M ass'y removal
   1) Unhook the tension spring at the lock slider A side attached to lock slider A and the M ass'y.
   2) Remove mounting screw fixing lock slider A, then separate lock slider A from the lock slider M ass'y.
   3) Remove two retaining washers, then remove the lock slider M ass'y.

Note: When removing lock slider M ass'y, leave lock slider A inside the mechanical deck.

2. FP-206 board removal
   Using a soldering iron, unsolder the three terminals of plunger solenoid, then remove FP-206 board.
3. Plunger solenoid removal
   Remove two mounting screws, then remove plunger solenoid.

Note: When removing mounting screws, take care not to damage T reel table ass'y with a screwdriver or touch it with your hand.

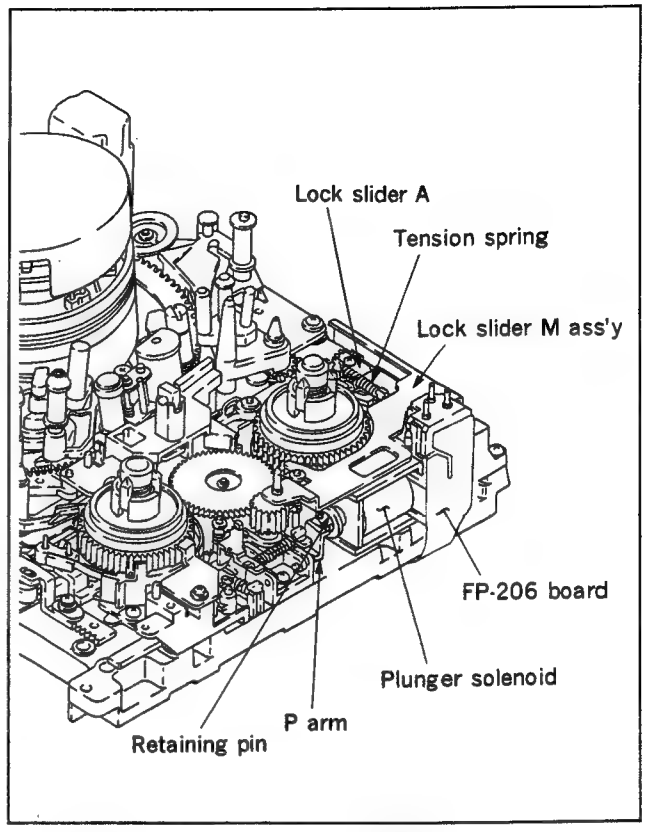


Fig. 4-22-1 Plunger solenoid replacement

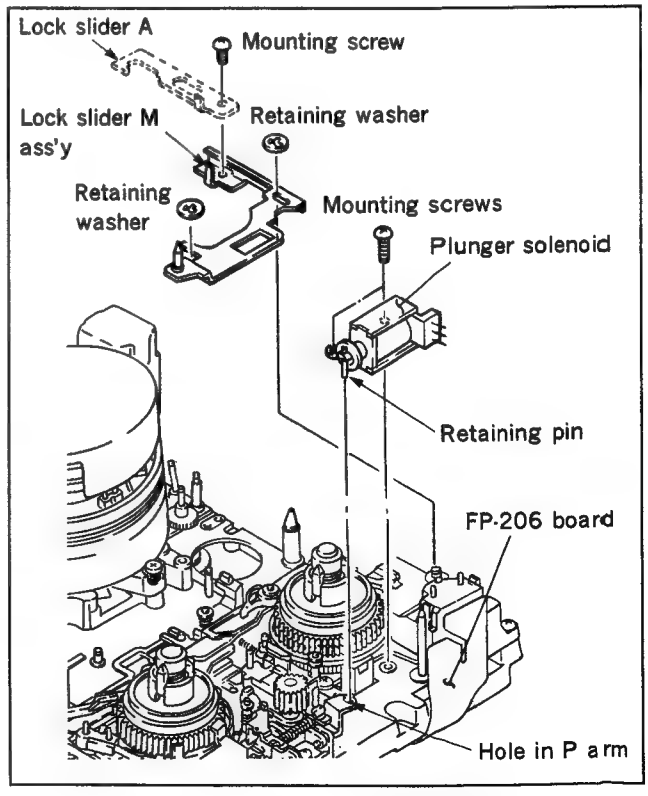


Fig. 4-22-2 Removing the plunger solenoid

4. Plunger solenoid replacement/installation

1) Replace plunger solenoid with a new one.

2) Align the retaining pin shown in Fig.4-22-2 with the hole in P arm, then insert retaining pin. Next, install plunger solenoid with two screws.

Note : When tightening screws, take care not to damage T reel table ass'y with a screwdriver or touch it with your hand.

5. FP-206 board installation

6. Lock slider M ass'y installation

For above steps 5 and 6, install components by reversing steps 1 and 2.
Replace all of retaining washers with new ones when installing a new plunger solenoid.

4-23. M SWITCH ASS'Y REPLACEMENT

Basic Knowledge

A To replace M switch ass'y, it is necessary to first remove many ass'y parts (virtually all of the parts listed in Fig.4-23-1). Take care not to lose or damage the removed parts.

B It is not easy to remove the above components. Take care not to damage other parts. Reinstallation work can be facilitated by paying attention to the disassembly sequence and removal method.

C Replace all removed retaining washers with new ones. Take care not to reuse the original retaining washers.

D Some of the above parts are coated with oil. Be careful not to touch them and then touch tape transport with oily hands. Be sure to clean tape transport if oil or other dirt gets onto it.

E To replace M switch ass'y, first remove the mechanical deck (refering to Section 2-6), then remove cassette compartment ass'y (referring to Section 2-7).

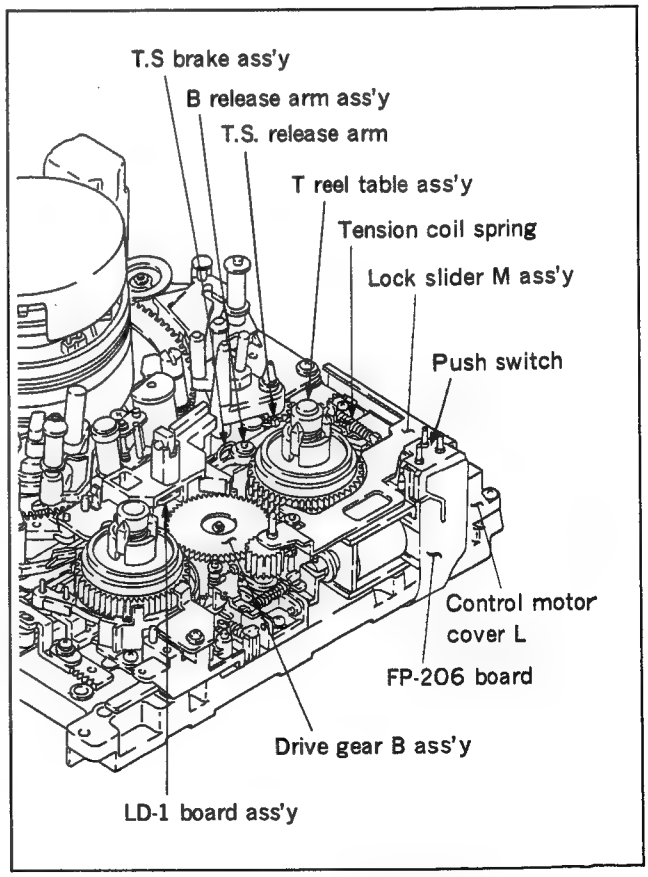


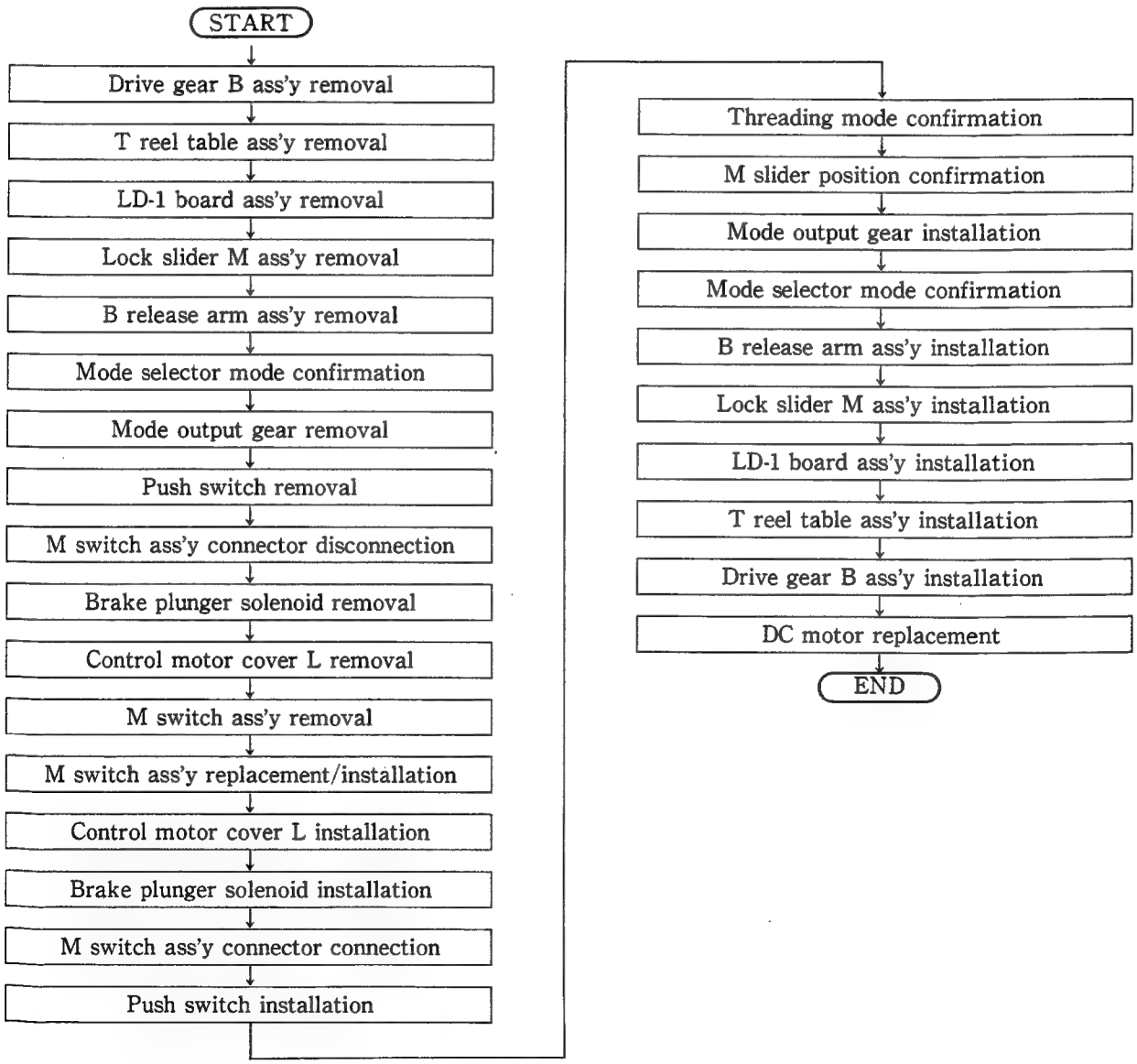
Fig. 4-23-1 M switch ass'y replacement

F If it is necessary to replace DC motor, refer to the section that describes M switch ass'y replacement procedure, then follow this procedure.

G Prepare the followings items for the replacement.

- Mode selector :
  Sony part No. J-6080-825-A
- Sony oil :
  Sony part No. 7-661-018-18

H Replacement flow chart



Replacement Procedure

1. Drive gear B ass'y removal (Fig. 4-23-2)
   Remove retaining washer, then remove drive gear B ass'y.

2. T reel table ass'y removal
   Remove T reel table ass'y referring to Section 4-15.

3. LD-1 board ass'y removal (Fig. 4-23-3)
   1) Disconnect the connector (CN301) from the RS-31 board at rear of mechanical deck.

   2) Remove the leg of the LD-1 board ass'y with a miniature screwdriver, as shown in the detailed drawing.

4. Lock slider M ass'y removal
   Remove lock slider M ass'y referring to item 1 of Section 4-22.

5. B release arm ass'y removal
   1) Remove the tension spring attached to B release slider and B release arm ass'y.

   2) Remove B release arm ass'y.

6. Mode selector mode confirmation
   Confirm that M mode of mode selector is EJECT mode.

7. Mode output gear removal (Fig.4-23-2)
   Remove retaining washer, then remove mode output gear.

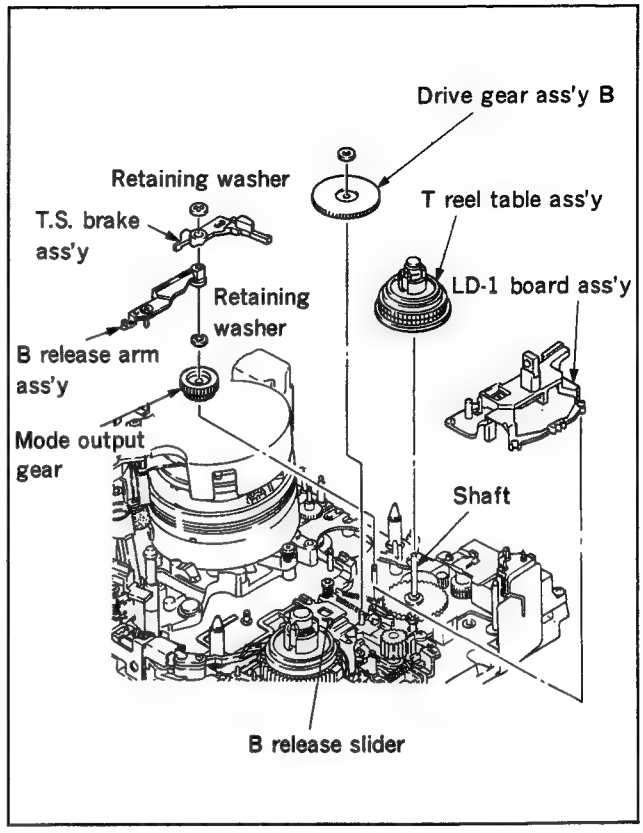


Fig. 4-23-2 Drive gear B ass'y removal

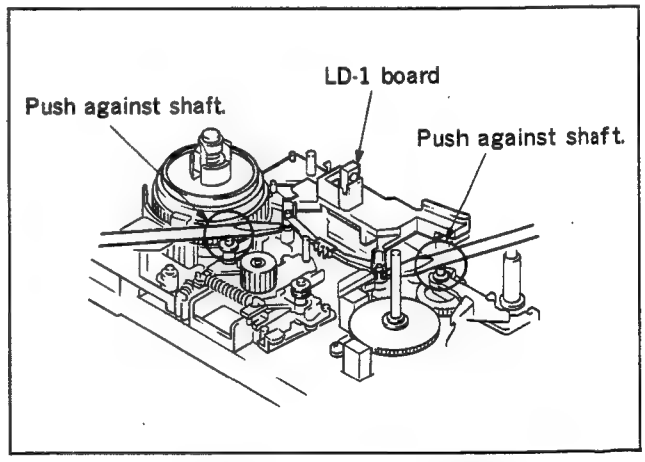


Fig. 4-23-3 Detailed drawing of removal of LD-1 board ass'y

8. Push switch removal (Fig.4-23-4)
   Disengage the two claws of the control motor cover L, then remove the push switch.

9. M switch ass'y connector disconnection (Fig.4-23-4)
   Disconnect the connector (6P) from MS-36 board.

10. Brake plunger solenoid removal
    Remove the Brake plunger solenoid referring to Section 4-22.

11. Control motor cover L removal (Fig.4-23-4)
    Remove two mounting screws, then remove control motor cover L.

12. M switch ass'y removal (Fig.4-23-4)
    1) Remove M switch ass'y mounting screw, then, while raising M switch ass'y, push T.S. release arm in the direction of arrow A.

    2) Push T main brake ass'y in the direction of arrow B, then remove M switch ass'y.

13. M switch ass'y replacement/installation
    1) Replace the M switch ass'y with a new one.

    2) Install a new M switch ass'y by reversing step 12.

14. Control motor cover L installation

15. Brake plunger solenoid installation

16. M switch ass'y connector connection

17. Push switch installation

For above steps 14, 15, 16 and 17, install the components by reversing steps 8, 9,10 and 11.

18. Threading mode confirmation
    Confirm that the mechanical block is in EJECT mode.

19. M slider position confirmation
    Confirm that M slider has been moved fully in the D direction.

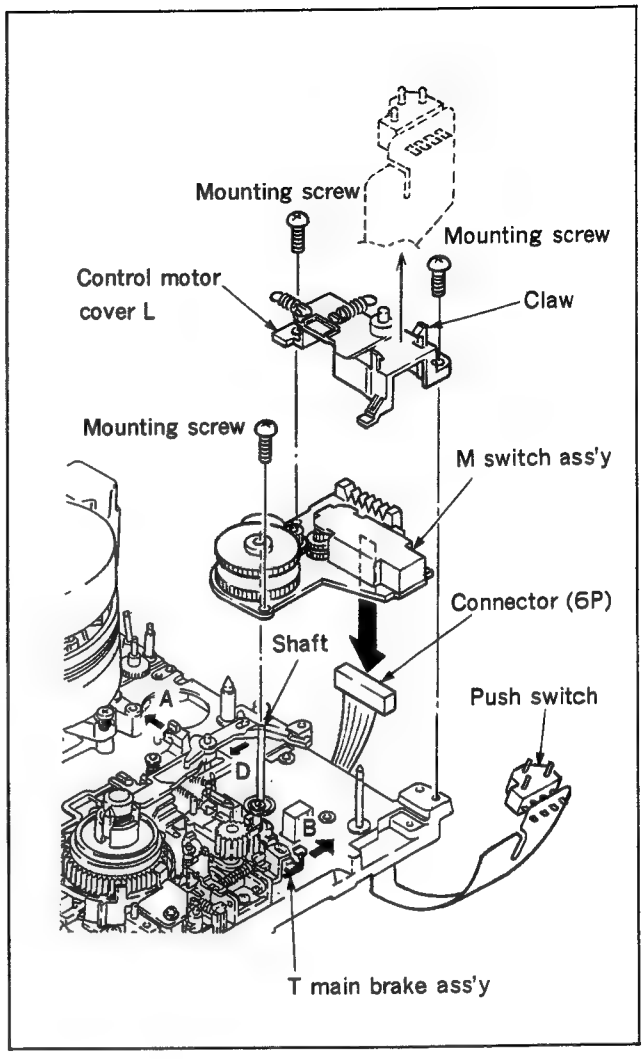


Fig. 4-23-4 M switch ass'y removal

20. Mode output gear installation
    1) Apply 1/2 a drop of oil to shaft of mode output gear.

    2) Rotate gear of M switch ass'y until the locating hole comes in line connecting the center of gear shaft and phase alignment holes. Install it on the shaft, as shown in Fig.4-23-5.

    3) Install retaining washer on the shaft to position the mode output gear in place.

21. Mode selector mode confirmation
    Press M mode select button of mode selector and enter into [LOADING/UNLOADING] mode.

22. B release arm ass'y installation

23. Lock slider M ass'y installation

24. LD-1 board ass'y installation

25. T reel table ass'y installation

26. Drive gear B ass'y installation

For above steps 22, 23, 24, 25 and 26, install the components by reversing the steps 1, 2, 3, 4 and 5.

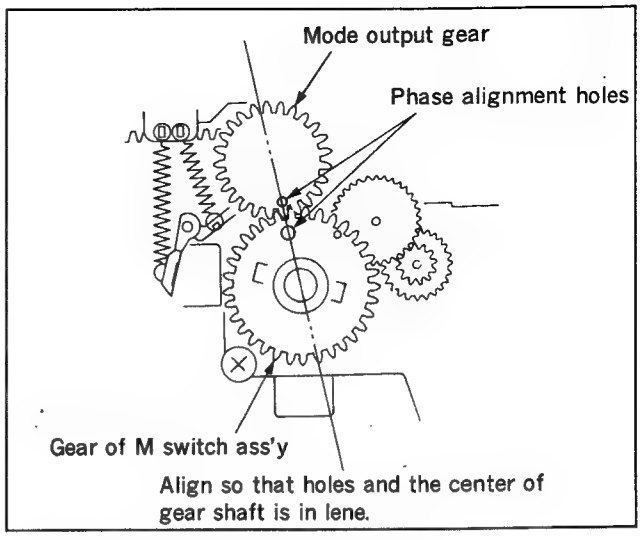


Fig. 4-23-5 Gear phase alignment

27. DC motor replacement (Fig.4-23-6)

1) Remove M switch ass'y referring to step 12.

2) Unsolder two terminals (C) of dc motor, then remove dc motor from MS-36 board

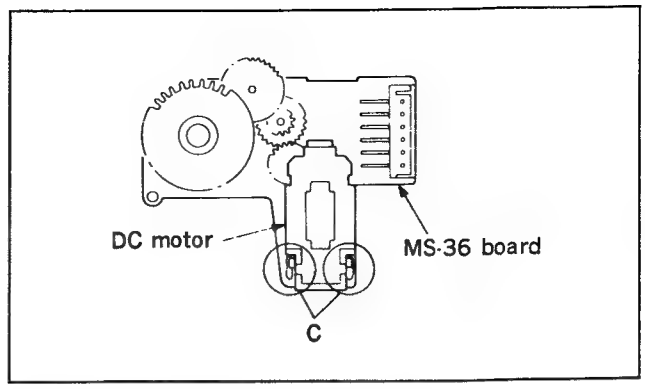


Fig. 4-23-6 DC motor replacement

4-24. M SLIDER REPLACEMENT

Basic Knowledge

A To replace M slider, first remove mechanical deck (referring to Section 2-6) and cassette compartment Ass'y (referring to Section 2-7).

B M slider is located at the lowest layer of the mechanical deck. When replacing it, it is necessary to first remove many components. Take care not to lose or damage the removed parts.

C It is not easy to remove the above components. Take care not to damage other parts. Replace each part according to the separate replacement procedures. This work can be facilitated by taking care when removing each part.

D Replace all removed retaining washers with new ones. Take care not to reuse the original retaining washers.

E Some of the above parts are coated with oil. Be careful not to touch them and then touch the tape transport with oily hands. Be sure to clean the tape transport if oil or other dirt gets onto it.

F Prepare the following items for the replacement.

- Mode selector :
  Sony part No. J-6080-825-A
- Sony oil :
  Sony part No. 7-661-018-18
- Sony grease :
  Sony part No. 7-662-001-62

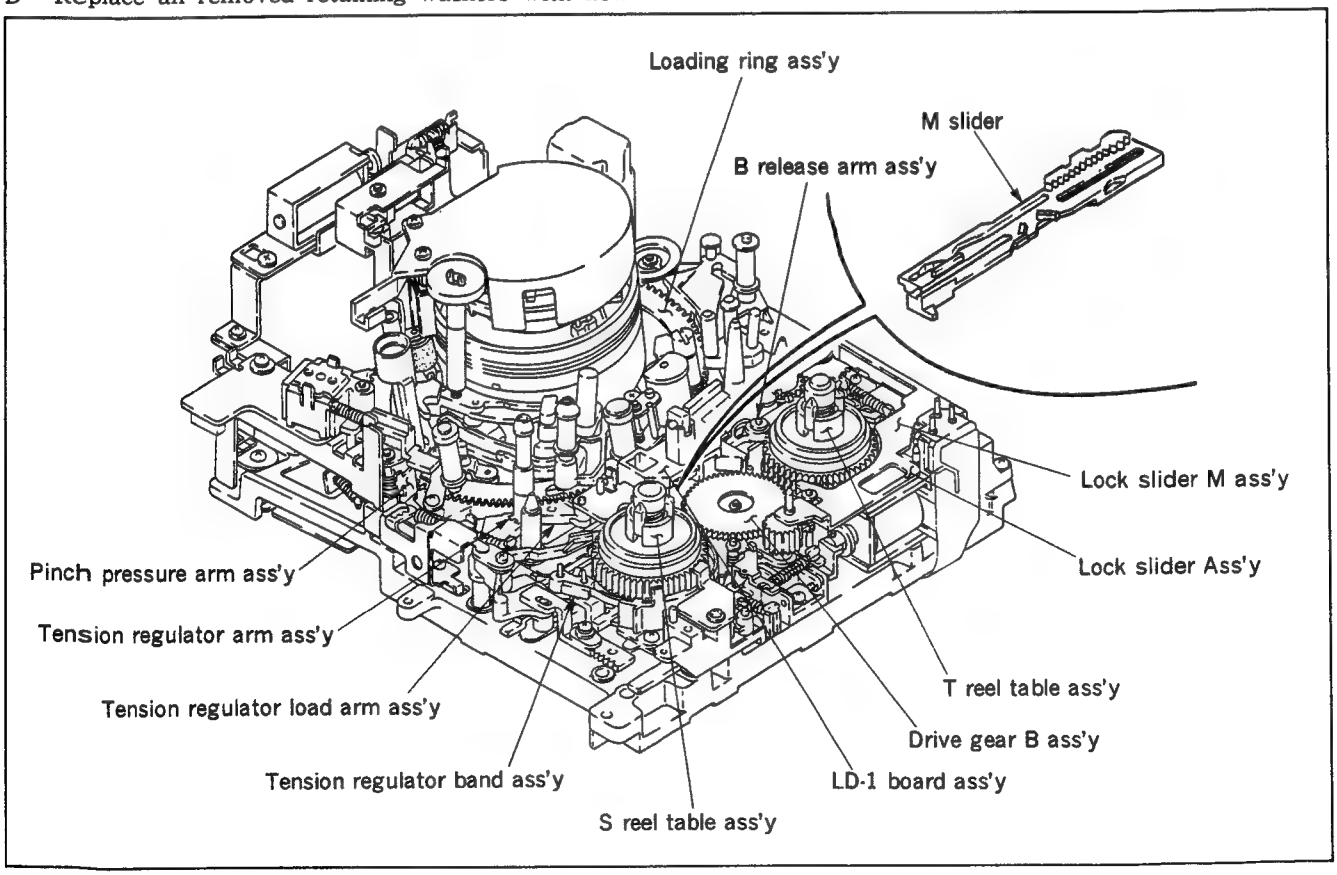


Fig. 4-24-1 M slider replacement

G Replacement flow chart

Replacement Procedure

1. Loading ring ass'y removal
   Remove loading ring ass'y referring to Section 4-4.

2. S reel table ass'y removal
   Remove S reel table ass'y referring to Section 4-14.

3. T reel table ass'y removal
   Remove T reel table ass'y referring to Section 4-15.

4. Pinch pressure arm ass'y removal
   Remove pinch pressure arm ass'y referring to Section 4-16.

5. Tension regulator arm ass'y removal
   Remove the tension regulator arm ass'y referring to Section 4-17.

6. Tension regulator band ass'y removal
   Remove the tension regulator band ass'y referring to Section 4-18.

7. Drive gear B ass'y removal

8. LD-1 board ass'y removal

9. Lock slider M ass'y removal

10. B release arm ass'y removal

For above steps 7, 8, 9 and 10, remove the components referring to Section 4-23.

11. Tension regulator load arm ass'y removal
    Remove tension regulator load arm ass'y referring to Section 4-19.

12. S/T main brake ass'y removal
    1) Unhook S side of tension spring that is hooked to S main brake ass'y and T main brake ass'y.
    2) Remove the two retaining washers securing both S and T main brake ass'ys, then remove S main brake ass'y and T main brake ass'y.

13. Mode selection
    Operate mode selector to establish L mode of LOADING TOP mode and M mode of LOADING, UNLOADING mode.

14. Drive block removal
    Remove mounting screw shown in Fig.4-24-2, then remove drive block.

15. Mode output gear removal
    Remove mode output gear referring to items 6 and 7 of Section 4-23.

16. REW brake ass'y removal (Fig.4-24-2)
    1) Remove two tension springs that are hooked to REW brake ass'y and B release slider.
    2) Remove REW brake ass'y and REW brake spacer from the shaft.

17. B release slider removal (Fig.4-24-2)
    Remove retaining washer, then remove B release slider.

18. RL arm removal (Fig.4-24-2)
    Remove retaining washer, then remove ring lock spring and RL arm.

19. Pinch pressure lever ass'y removal (Fig.2-24-2)
    1) Move M slider to the right (leave about 5 mm between the shaft of pinch pressure lever ass'y and left end of M slider oblong hole).
    2) Remove E ring from the shaft, then remove pinch pressure lever ass'y.

20. Hard brake S removal (Fig.2-24-2)
Remove tension spring, then remove hard brake S.

21. M slider removal (Fig.2-24-2)
Remove retaining washer, then push the mode arm in the direction of the arrow. Next, raise the left side of M slider and remove M slider.

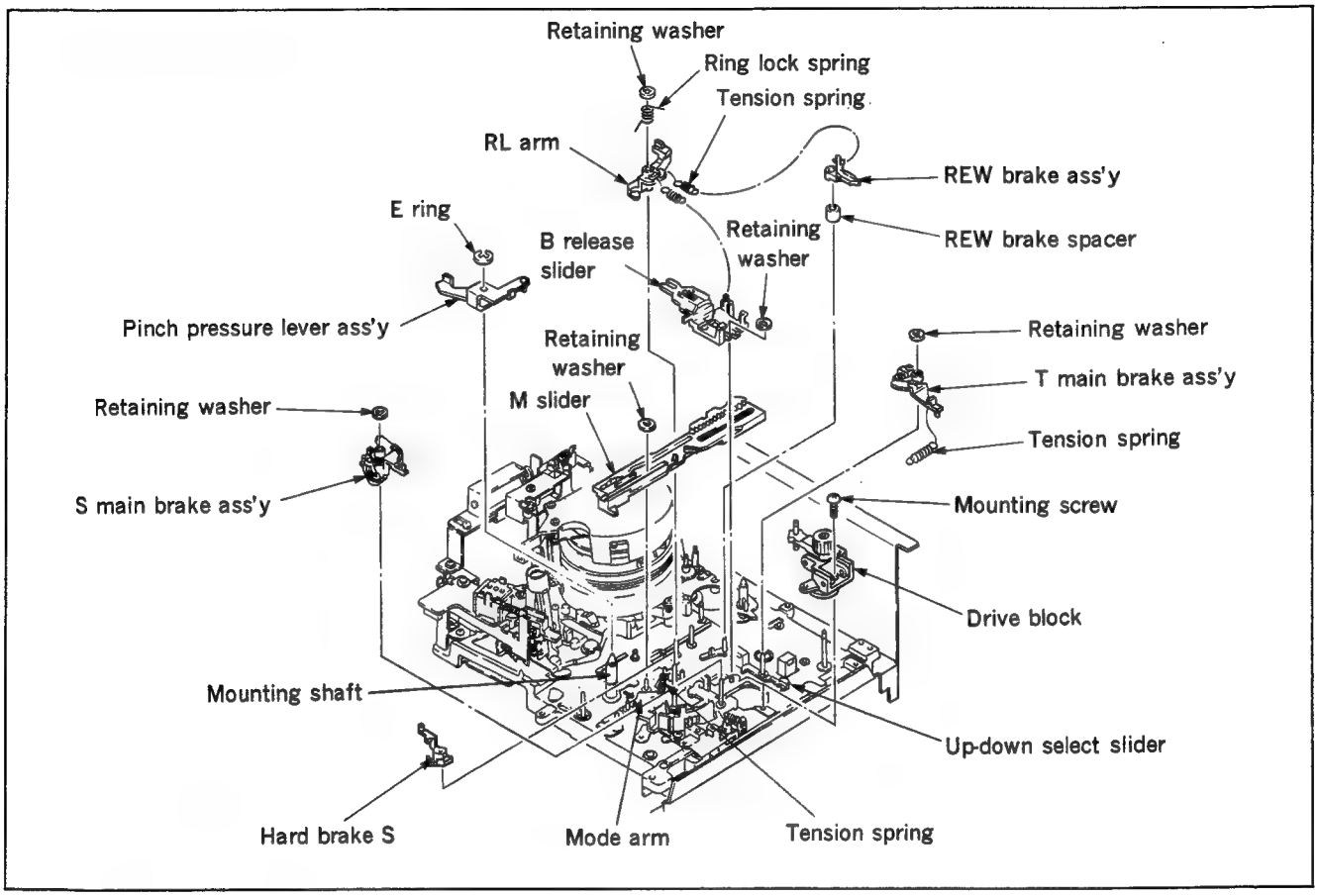


Fig 4-24-2. M slider replacement

22. M slider replacement/installation
    1) Replace M slider with a new one, then smear grease to the points indicated in Fig.A of Fig.4-24-3.

    2) Push the mode arm as indicated in Fig.4-24-2 in the direction of the arrow, then refer to Fig.B to install M slider while being careful of the other parts above and beneath it, and fix it with retaining washer.

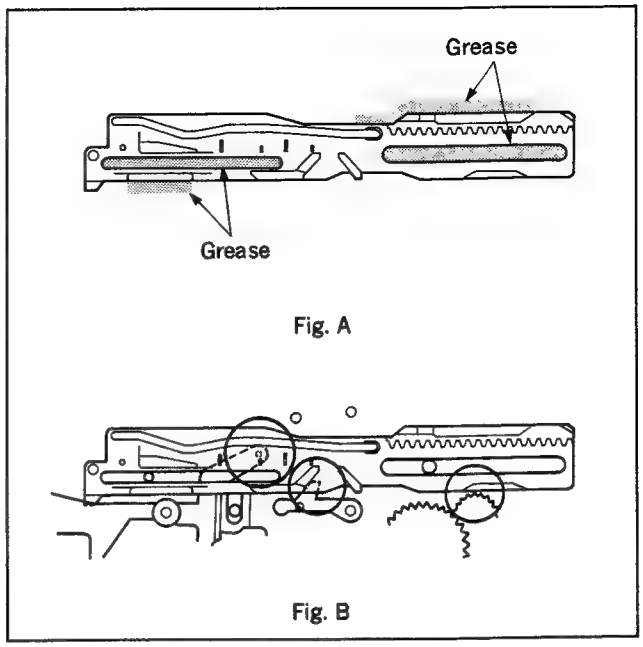


Fig. 4-24-3 M slider installation

23. Hard brake S installation
    Install the hard brake S on the shaft, then attach tension spring.

24. Pinch pressure lever ass'y installation
    1) Smear grease to the point indicated in Fig.4-24-4.

    2) Smear 1/2 a drop of oil to the shaft below the groove, shown in Fig.4-24-4.

    3) Install pinch pressure lever ass'y on the shaft, and fix it with E ring.

25. RL arm installation

26. B release slider installation

27. REW brake ass'y installation

1) For steps 25, 26 and 27, install components by reversing steps 16, 17 and 18.

2) Tension springs that are hooked to REW brake ass'y and B release slider are the same parts.

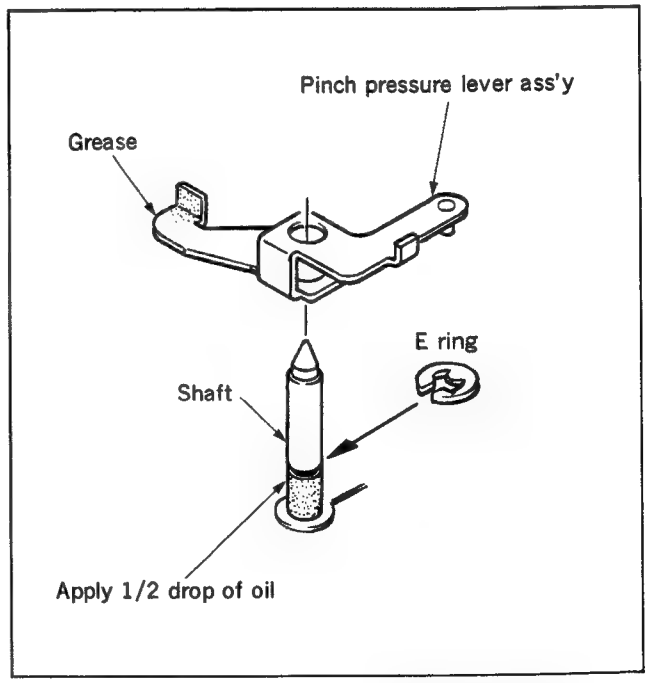


Fig 4-24-4. Pinch pressure lever ass'y installation

28. Mode selection
    1) Move the M slider fully left.

    2) Press M mode select button of mode selector, and enter into [EJECT] mode.

29. Mode output gear installation
    Install mode output gear referring to item 18 of Section 4-23.

30. Mode selection
    Press M mode select button of mode selector, and enter into [LOADING/UNLOADING] mode.

31. Drive block installation
    Insert horizontal shaft of drive block into the groove of the up-down select slider, then fix the shaft with the mounting screw.

32. S/T main brake ass'y installation

33. Tension regulator load arm ass'y installation

34. B release arm ass'y installation

35. Lock slider M ass'y installation

36. LD-1 board ass'y installation

37. Drive gear B ass'y installation

38. Tension regulator arm band ass'y installation

39. Tension regulator arm ass'y installation

40. Pinch pressure arm ass'y installation

41. T reel table ass'y installation

42. S reel table ass'y installation

43. Loading ring ass'y installation

For above steps 32 through 43, install components by reversing steps 1 through 12.

44. Tape transport check
    Check tape transport according to Section 6-6.

4-25. CASSETTE COMPARTMENT ASS'Y REPLACEMENT

Basic Knowledge

A Cassette compartment ass'y is normally replaced as a complete assembly. Carry out replacement referring to Section 2-7.

B There is no need to perform adjustment after replacement of the cassette compartment ass'y, however check the operation of the new cassette compartment ass'y.

C If the components of the block plate were removed necessity, re-install them as described in the following section. Re-install other components referring to exploded view.

4-25-1. Block Plate Ass'y Installation

Install block plate ass'y referring to Fig.4-25-1.

(1) Push lock slider ass'y in the direction of arrow ⓐ, and raise cassette holder.
(2) Confirm that the lock lever position with respect to the pin is as shown in Fig.A.
(3) Rotate the worm gear in the direction of arrow ⓑ until gear B and gear C are engaged each other.
(4) Confirm that position of the pin of the gear lever ass'y with respect to lock lever is as shown in Fig. B, then fix the block plate ass'y to cassette compartment ass'y mounting plate L with the three mounting screws.
(5) Confirm that gear C and gear D engaged with each other.

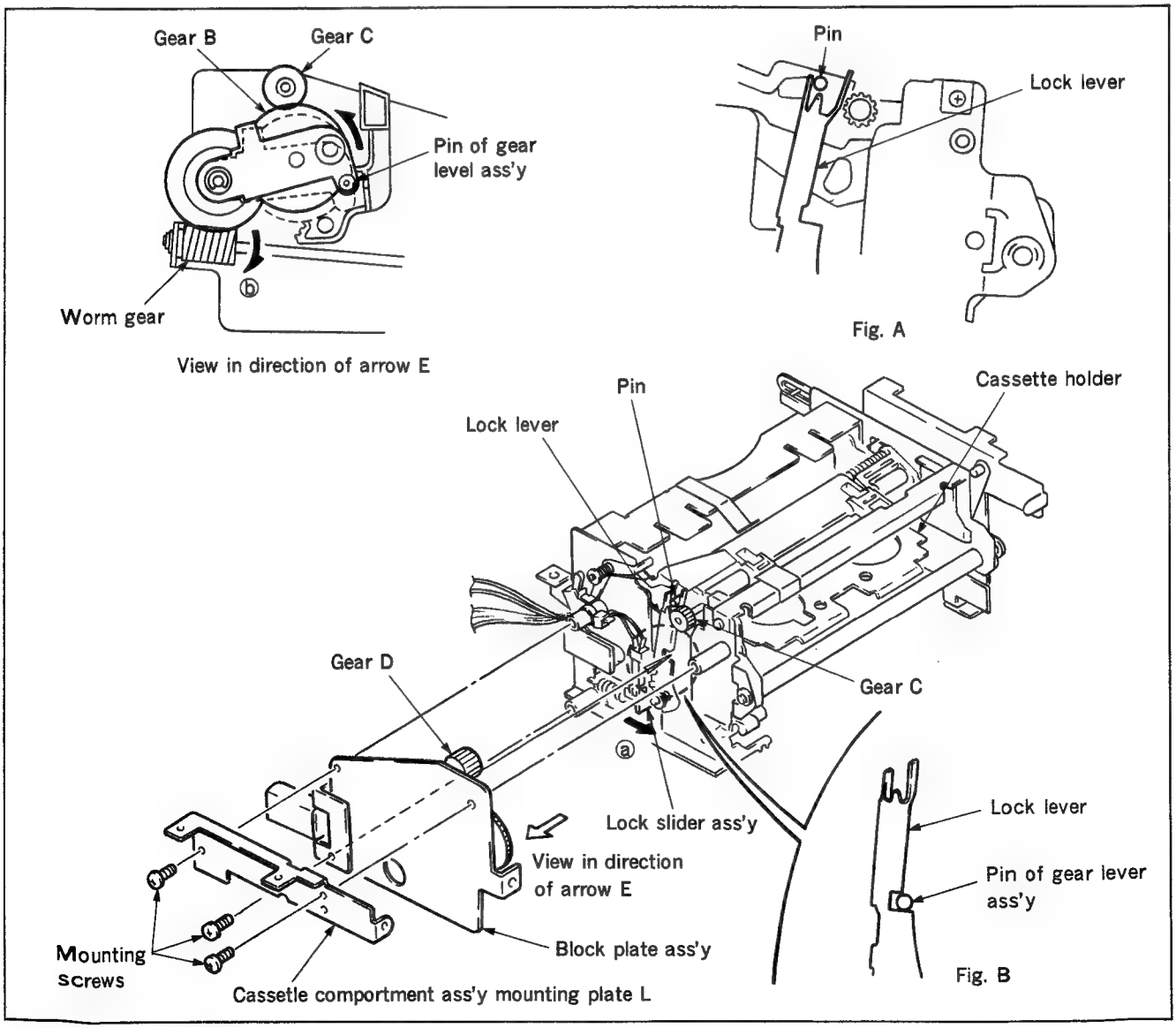


Fig. 4-25-1 Block plate ass'y installation

4-25-2. Cassette Holder Parallelism (torsion) Adjustment

Basic Knowledge

Carry out adjustment if the following trouble occurs.

- Trouble: If the cassette catches on the cassette holder or the connecting rod, for example, preventing it from moving smoothly, when the cassette is inserted or ejected

Adjustment Procedure

1) Remove cassette compartment ass'y referring to Section 2-7.
2) Remove four mounting screws, then remove window ass'y.
3) Insert a screwdriver into the hole in the cassette compartment ass'y mounting plate R, and loosen the screw.
4) Push the bottom of cassette holder until it strikes the reinforcing plate, then perform adjustment until there are no clearances (at both A and B).
5) Tighten the screw, then coat it with thread locking compound.
6) Re-install the parts by reversing steps (1) through (3).

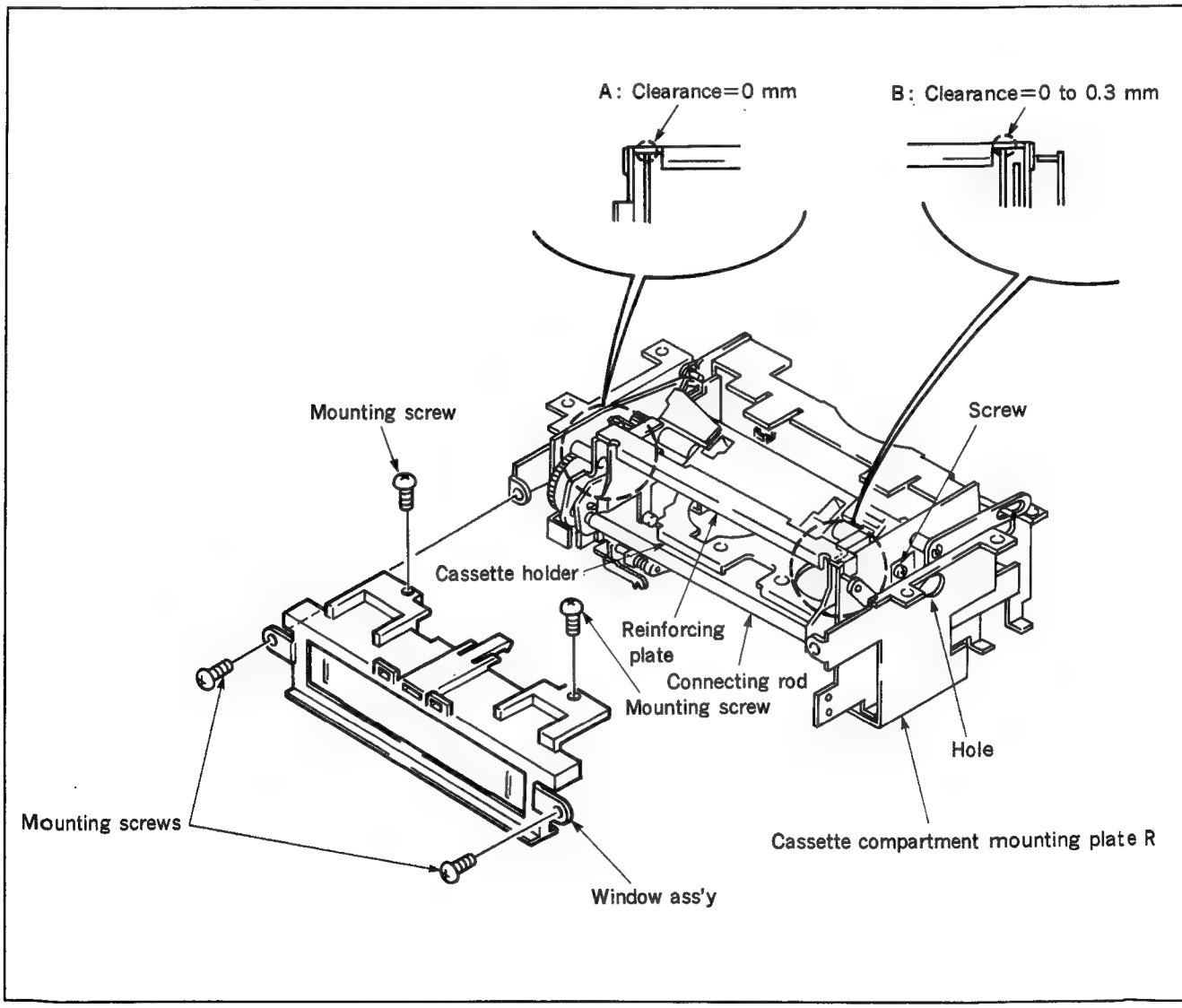


Fig. 4-25-2 Cassette holder parallelism adjustment

SECTION 5
TORQUE AND BACK TENSION ALIGNMENT

- Carry out these adjustments except for Section 5-4 after removing the Mechanical Deck Block and Cassette Compartment Assembly referring to Sections 2-6 and 2-7.
- Connect the Mode Selector to the mechanical deck. (Refer to Section 4 operation of Mode Selector.)

5-1. CHECK OF MAIN BRAKE TORQUE

5-1-1. S Main Brake Torque

Tool:

Mode Selector
SONY Parts No. :J-6080-825-A
Tension Measurement Reel
SONY Parts No. :J-6080-832-A
Dial Tension Gauge
SONY Parts No. :J-6080-827-A

Mode:

Press the M-mode select button of the Mode Selector and put into the FF/REW mode.

Check Procedure: (Fig. 5-1-1)

(1) Install Tension Measurment Reel on S Reel Table. Hook Dial Tension Gauge at the end of string.

(2) Pull out the Dial Tension Gauge in the direction of the arrow. Check that these readings meet the required specifications. (Figs. 1 and 2)

Note: Both S Main Brake and S Soft Brake work into the FF/REW mode.

Adjustment Procedure:

(1) If not to meet the required specifications, replace the S Main Brake or S Reel Table Assembly.

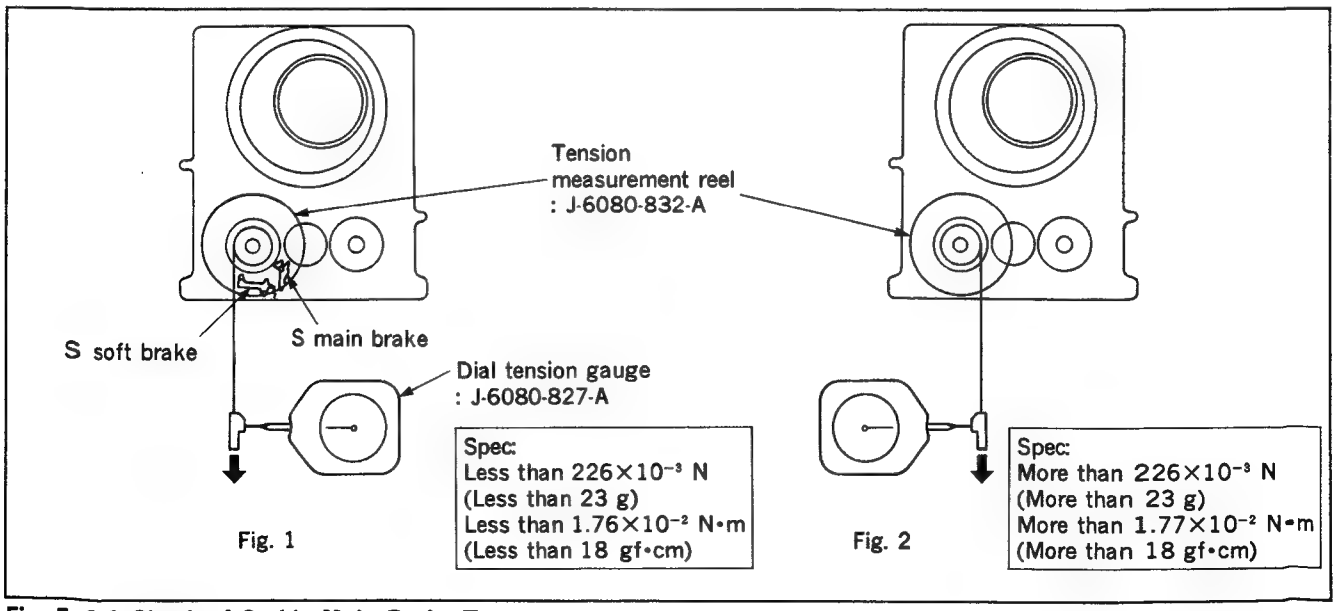


Fig. 5-1-1 Check of S side Main Brake Torque

5-1-2. T Main Brake Torque

Tool:

Mode Selector
SONY Parts No. :J-6080-825-A
Tension Measurement Reel
SONY Parts No. :J-6080-832-A
Dial Tension Gauge
SONY Parts No. :J-6080-827-A

Mode:

Press the M-mode select button of the Mode Selector and put into the FF/REW mode.

Check Procedure: (Fig. 5-1-2)

(1) Install the Tension Measurement Reel on T Reel Table. Hook the Dial Tension Gauge at the end of string.
(2) Pull out the Dial Tension Gauge in the direction of the arrow. Check that these readings meet the required specifications. (Figs. 1 and 2)
Note: Both T Main Brake and REW Brake work into the FF/REW mode.

Adjustment Procedure:

(1) If not to meet the required specificaiton, replace T Main Brake or T Side Reel Table Assembly.

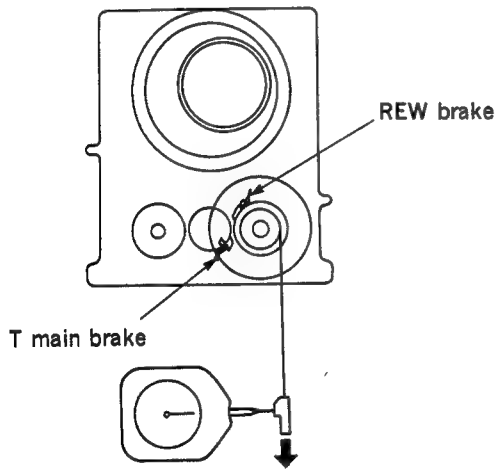


Fig. 1

Spec:
Less than 226×10^{-3} N
(Less than 23 g)
Less than 1.76×10^{-2} N•m
(Less than 18 gf•cm)

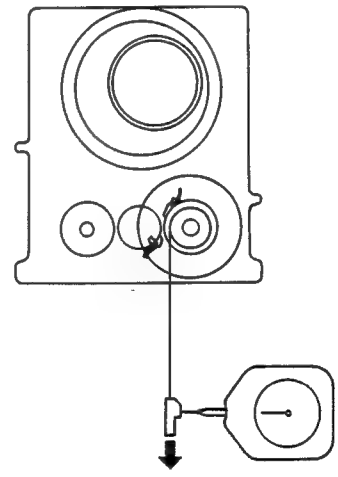


Fig. 2

Spec:
More than 226×10^{-3} N
(More than 23 g)
More than 1.77×10^{-2} N•m
(More than 18 gf•cm)

Fig. 5-1-2 Check of T side Main Brake Torque

5-2. CHECK OF SOFT BRAKE TORQUE

5-2-1. S Side Soft Brake Torque

Tool:

Mode Selector
SONY Parts No. :J-6080-825-A
Tension Measurement Reel
SONY Parts No. :J-6080-832-A
Dial Tension Gauge
SONY Parts No. :J-6080-827-A

Mode:

Press the M-mode select button of the Mode Selector and put into the FF/REW mode.

Check Procedure: (Fig. 5-2-1)

(1) Install the Tension Measurement Reel on the S Reel Table. Hook the Dial Tension Gauge at the end of string.
(2) Release the S Main Brake by finger.
(3) Pull out the Dial Tension Gauge in the direction of the arrow while releasing the S Main Brake. Check that the reading meets the required specification.

Adjustment Procedure:

(1) Adjust the strength of S Soft Brake Spring by stretching or cutting.

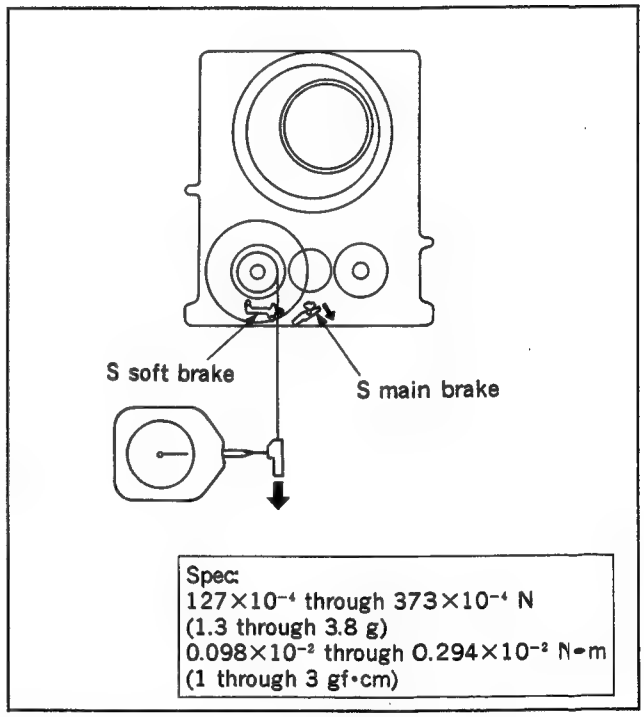


Fig. 5-2-1 Check of S side Soft Brake Torque

5-2-2. T Side Soft Brake Torque

Tool:

Mode Selector
SONY Parts No. :J-6080-825-A
Tension Measurement Reel
SONY Parts No. :J-6080-832-A
Dial Tension Gauge
SONY Parts No. :J-6080-827-A

Mode:

Press the M-mode button of the Mode Selector and put into the FWD mode.

Check Procedure: (Fig. 5-2-2)

(1) Install the Tension Measurement Reel on the T Reel Table. Hook the Dial Tension Gauge at the end of the string.
(2) Release the T Main Brake by finger.
(3) Pull out the Dial Tension Gauge in the direction of the arrow while releasing the T Main Brake. Check that the reading meets the required specification.
Note: Both T Main Brake and REW Soft Brake work into the FWD mode.

Adjustment Procedure:

(1) Change the position of the tension spring which is hooked to the T Soft Brake.
- More than the specification:
  Hook the left side.
- Less than the specification:
  Hook the right side.

(2) If the reading do not meet the required specification with step (1), or replace the T Soft Brake or REW Brake, or both them.

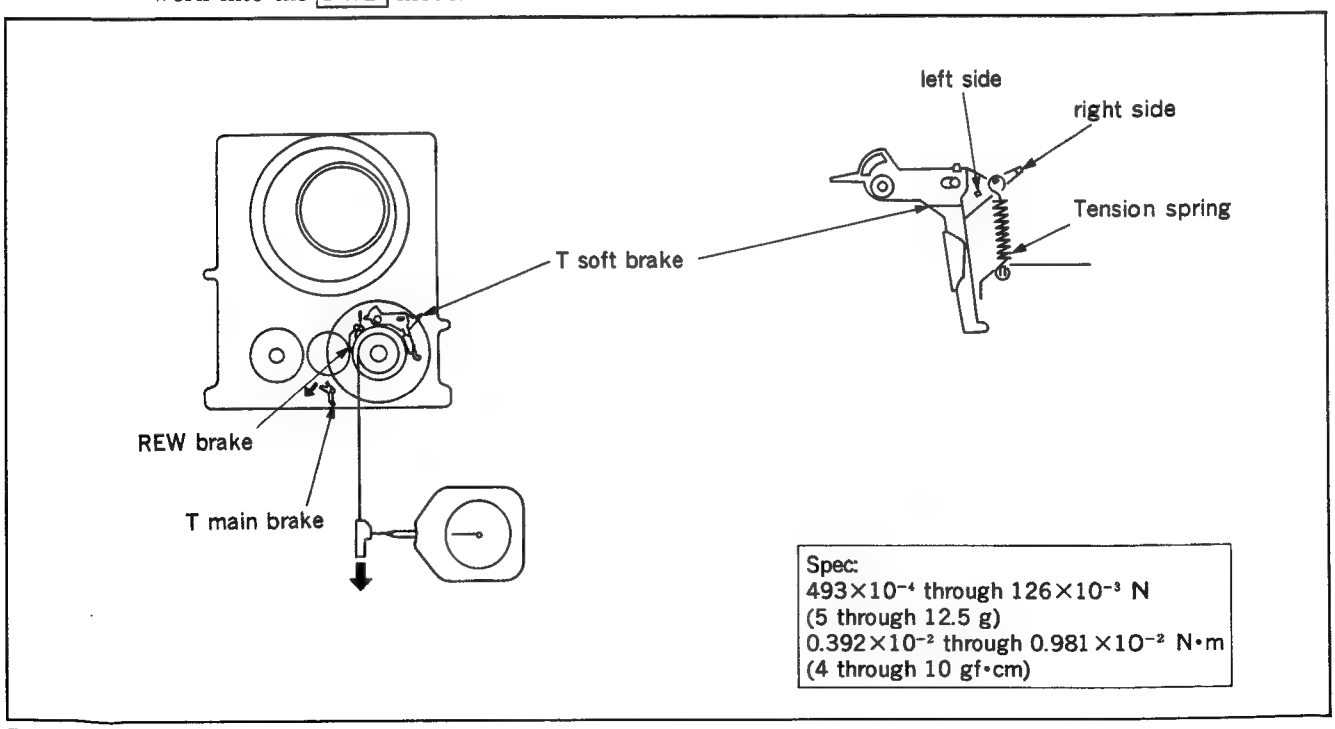


Fig. 5-2-2 Check of T side Soft Brake Torque

5-3. CHECK OF REW BRAKE TORQUE

Tool:

Mode Selector
SONY Parts No. :J-6080-825-A
Tension Measurement Reel
SONY Parts No. :J-6080-832-A
Dial Tension Gauge
SONY Parts No. :J-6080-827-A

Mode:

Press the M-mode select button of the Mode Selector and put into the FF/REW mode.

Check Procedure: (Fig. 5-3-1)

(1) Install the Tension Measurement Reel on the T Reel Table. Hook the Dial Tension Gauge at the end of the string.
(2) Release the T Main Brake by finger.
(3) Pull out the Dial Tension Gauge in the direction of the arrow while releasing the T Main Brake. Check that the reading meets the required specification.

Adjustment Procedure:

(1) Replace the REW Brake with a new one, or adjsut the strength of the tension spring by stretching or cutting.

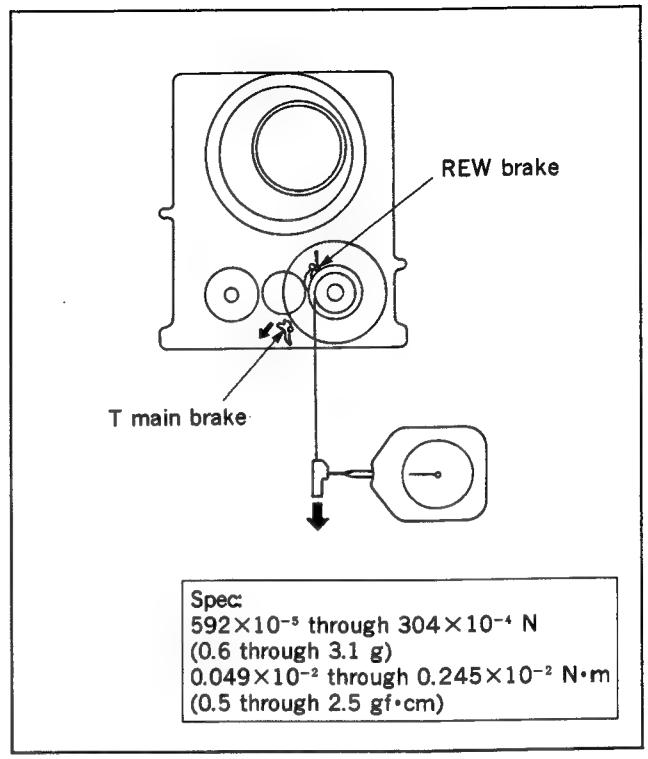


Fig. 5-3-1 Check of REW Brake Torque

5-4. CHECK WITH FWD, RVS WINDING TORQUE CASSETTE

Tool:

FWD, RVS Winding Torque Cassette
SONY Parts No. :J-6080-824-A

Mode:

Install the Mechanical Deck Block to the unit.
PLAY mode and RVS×1 mode

Check Procedure:

(1) Insert a FWD, RVS Winding Torque Cassette into the unit.
(2) Put into the PLAY mode. Check that the torque reading of the T Reel Table meets the required specification.

Spec: 0.932×10^{-2} through 1.52×10^{-2} N•m
(9.5 through 15.5 gf•cm)

(3) Put into the SHUTTLE mode. Check that the torque reading of the S Reel Table meets the required specification just after putting into the RVS×1 mode.

Spec: 1.272×10^{-2} through 2.448×10^{-2} N•m
(13 through 25 gf•cm)

Adjustment Procedure:

(1) If the torque reading of the T Reel Table (Check Procedure (2)) do not meet the required specification, replace each Reel Table Assembly.
(2) If the torque reading of the S Reel Table (Check Procedure (3)) do not meet the required specification, adjust it by turning ◐ RV805/SST-2 Board.

5-5. FWD BACK TENSION ADJUSTMENT

Tool:

Mode Selector
SONY Parts No. :J-6080-825-A
Tension Measurement Reel
SONY Parts No. :J-6080-831-A
Dial Tension Gauge
SONY Parts No. :J-6080-827-A

Mode:

Press the L-mode select button of the Mode Selector and put into the [LOADING END]. Press the M-mode select button of the Mode Selector and put into the [FWD] mode.

Check Procedure: (Fig. 5-5-1)

(1) Remove the Cassete Compartment referring to Section 2-7.
(2) Press the L-mode select button of the Mode Selector and put into the [LOADING END] mode. Press the M-mode select button of the Mode Selector and put into the [FWD] mode.
(3) Loosen a fixing screw and move Band Adjustment Plate in the direction of arrow A. Check the possible movement range θ of No. 1 Guide.

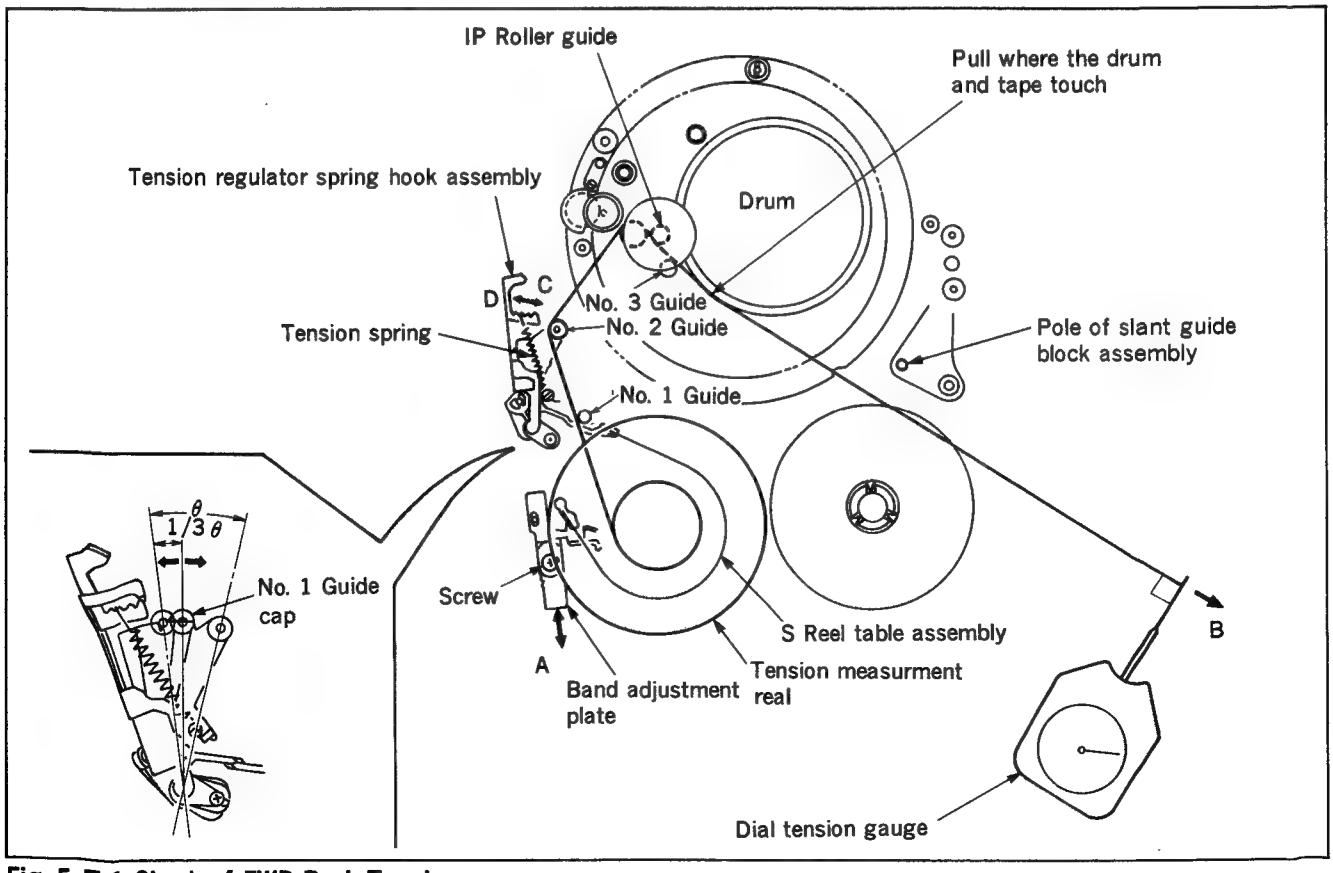


Fig. 5-5-1 Check of FWD Back Tension

(4) Tighten the fixing screw where No. 1 Guide Cap is situated at 1/3 of θ.
(5) Install the Tension Measurement Reel on the S Reel Table and trail the tape along the No. 1 Guide, No. 2 Guide, IP Roller Guide, No. 3 Guide and Drum.
(6) Hook the Dial Tension Gauge at the end of the tape. Pull out the Dial Tension Gauge at the constant speed apporox 15 cm/sec. in the direction of arrow B. At same time check that this reading meets the required specification.

Spec: 1.18×10^{-2} through 1.372×10^{-2} N•m (12 through 14 gf•cm)

Adjustment Procedure:

(1) If not to meet the required specification, change the position of the tension spring which is hooked to the Tension Regulator Spring Hook Assembly.
- More than the specification: The direction of arrow C
- Less than the specification: The direction of arrow D

Note: When replacing the parts as follows, perform the FWD Back Tension Adjustment.
- Tension Regulator Band Assembly
- S Reel Table Assembly
- Entrance Guide (K) Assembly

When replacing the parts, adjust the FWD Back Tension after carring out the tape running into the FWD mode for 2 minutes.

Adjustment Procedure after Part Replacement

(1) Install the Cassette Compartment Assembly with Removal Steps of Section 2-7 in reverse order.
(2) Install the Mechanical Deck Block with Removal Steps of Section 2-6 in reverse order.
(3) Insert a cassette tape in the unit and carry out the FWD running for 2 minutes.
(4) Eject the cassette tape.
(5) Remove the Mechanical Deck Block from the unit referring to Section 2-6.
(6) Carry out the FWD Back Tension Adjustment referring to Section 5-5.

5-6. S-TENSION SENSOR ADJUSTMENT

Note: This adjustment is required when replacing the S-tension sensor Ass'y itself.

Tool:

FWD/RVS Take-Up Torque Cassette
Part No. :J-6080-824-A
S-Tension adjustment tool
Part No. :J-6257-560-A
Flat blade screwdrive (tip width : 5.5 mm or more)

Mode:

Install the Mechanical Deck Block to the unit.
Set to the [UNLOADING] state and [RVS×1] mode by switching the power ON.

Check Procedure :

(1) Confirm the unit is in the UNLOADING state by turning the POWER switch ON.

(2) Install the S-tension Sensor Adjust Tool in the order of ①, ② and ③ in Fig. 5-6-1, on the Mechanical Deck (push the tool to the right so that remove the horizontal play.)

(3) Short between TP904 and TP905 on the SST-2 board with shorting lead, and measure the voltage at TP802 ("A" volt).
Remove the shorting lead, and confirm the voltage at TP802 ("B" volt) satisfies the specification.

Spec: B=A±0.02 V

(4) Remove the S-tesion Sensor Adjust Tool. Screw the MD frame to the chassis of the unit in its original place, then insert the FWD/RVS take-up torque cassette.

(5) Confirm that the torque on the S Reel Table side satisfies the specification when set to [SHUTTLE] mode and running at [RVS×1] speed.

Spec: $[1.86 \pm 0.588] \times 10^{-2}$ N·m
(19±6 gf·cm)

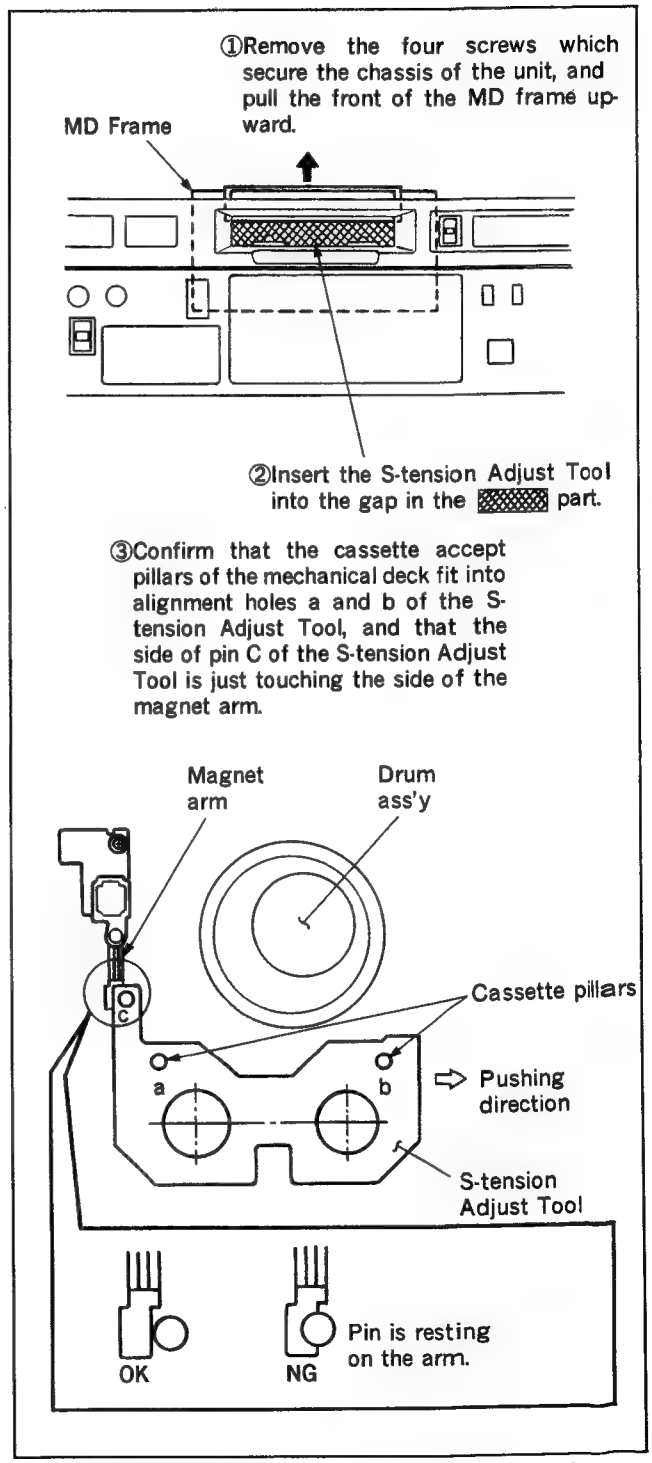


Fig. 5-6-1 How to Set the S-tension Adjust Tool

Adjustment Procedure:

(1) In step (3), if the voltage of TP802 does not satisfy the specification, adjust it as follows. Loosen a screw of the TR-72 board on the S-tension Sensor Ass'y, insert a flat blade screwdriver into the slot and twist the board right or left until the voltage is satisfied. (Refer to Fig. 5-6-2). Then tighten the screw.

(2) If the torque does not satisfy the specification in step (5), turn RV805 on the SST-2 board so that the torque is within the specification.

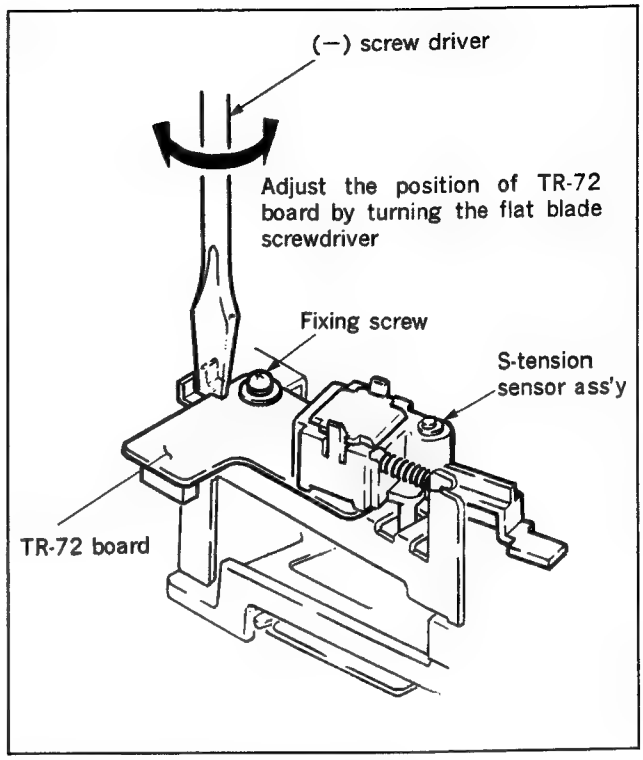


Fig. 5-6-2 TR-72 Board Adjustment

SECTION 6
TAPE RUN ALIGNMENT

Tape Run Alignment in this supplement describes two adjustment procedures for the unit of S/N 10001 through 10340, S/N 10341 through 11380, and S/N 11381 and later.

- This section describes how to adjust the tape run if a problem occurs with the tape run mechanism or if a mechanical part is replaced. Use this section to find the source of the problem. Only make adjustments if a problem is recognized or a part is replaced.
- Check that the Electrical Alignments detailed in Sections 7 thru 10 have been completed before starting to make adjustments.
- Fig. 6-1 shows the tape guide location in the threaded-end condition during tape run. Comment to be added to Fig. 6-1 are ; Guide No.1 is located on tension regulator arm ass'y. Guide No.2 and Guide No.3 are on entrance guide (K) ass'y, No.9, No.10 and Guide No.11 are on slant guide block, Guide No.6 is on pinch roller, No.7 and Guide No.8 are installed on loading ring.

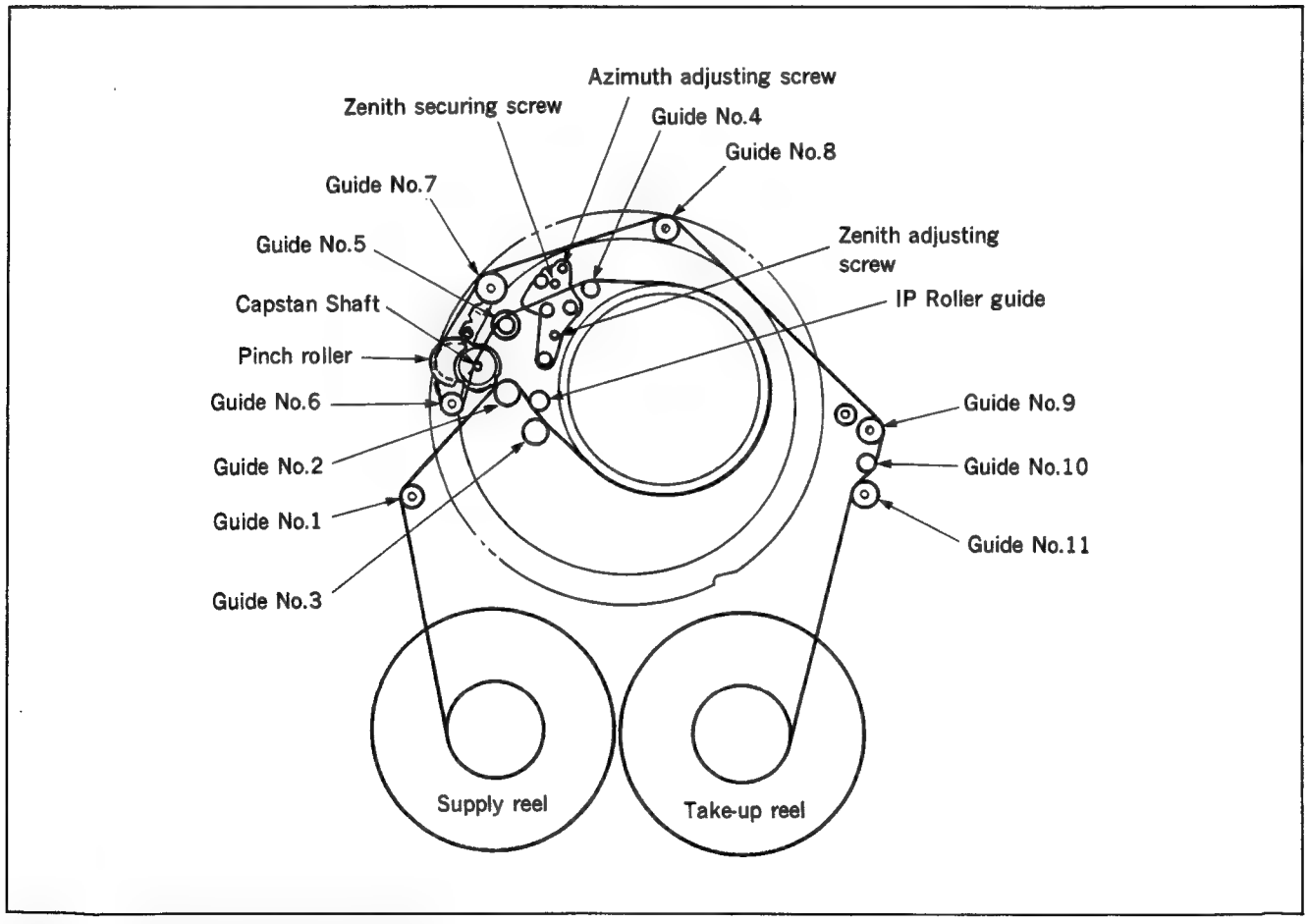


Fig. 6-1 Tape guide location diagram

Information before adjustment

A Prepare the following items for the adjustment

- Track Shift Tool
  Sony part No. J-6080-891-A
- Alignment Tape (WR5-1NP)
  Sony part No. 8-967-995-02
- Alignment Tape (WR2-3NS)
  Sony part No. 8-967-992-12
- Commercially available tape
  : E6-120HME
  : P6-120HMP
- RF/SWP Connector
  Sony part No. J-6080-883-A
- REC Head PB Harness
  Sony part No. J-6269-000-A
- Cleaning Fluid
  Sony part No. Y-2031-001-1
- Wiping Cloth
  Sony part No. 7-741-900-53
- Small Adjustment Mirror
  Sony part No. J-6080-840-A
- No. 6 Guide Lock Screwdriver
  Sony part No. J-6080-826-A
- Hexagonal Screwdriver (0.89mm)
  Sony part No. 7-700-766-01
- Torque Driver with Hexagonal Bit (+ No.0 bit)
- Oscilloscope

B Description on Track Shift Tool

8mm video system employs ATF (automatic track finding) system that provides high accurate tracking automatically by controlling tape run speed instantaneously using four different types of pilot signal. It has eliminated TRACKING control, providing accurate tracing of recorded pattern on magnetic tape.

The ATF system has difficulty in aligning tape path mechanism on the contrary, because head's trace error is automatically corrected so that mechanical error cannot be readily found.

Original purpose of the Track Shift Tool is to cancel the ATF function of EVO-9850 and to determine the tracking value manually. Because this function has been incorporated in EVO-9850 VTR, the Track Shift Tool is used only for observing the RF waveform of each channel. Actual track shift adjustment is carried out by the adjustment control RV on SST-2 board of EVO-9850.

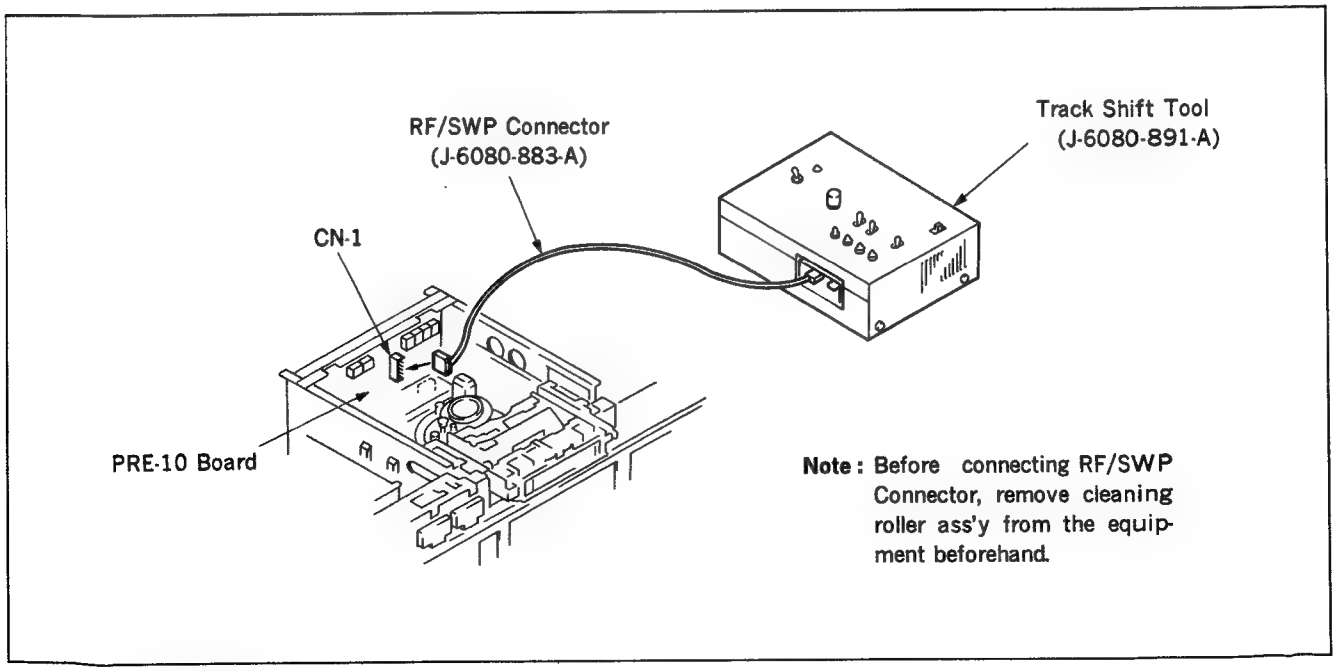


Fig. 6-2 Connection of connectors

C Cleaning Roller Ass'y Removal
Tape run alignment requires removal of cleaning roller from the equipment beforehand. Remove the cleaning roller ass'y, referring to section 4-5. Cleaning Roller Removal. Install it after all the alignments are completed, referring to section 4-5.

6-a. Connection with Track Shift Tool

- Connection of connectors
  Use the connecting cable (Sony part No. J-6080-883-A) for this connection.
  Connect Track Shift Tool with the equipment referring to Fig.6-2.
  (See operating instruction of Track Shift Tool for details.)
- Connect the RF/SWP connector to CN1 of PRE-10 board.

[Specified connecting cable]
- RF/SWP connector connecting cable (Sony part No. J-6080-883-A)

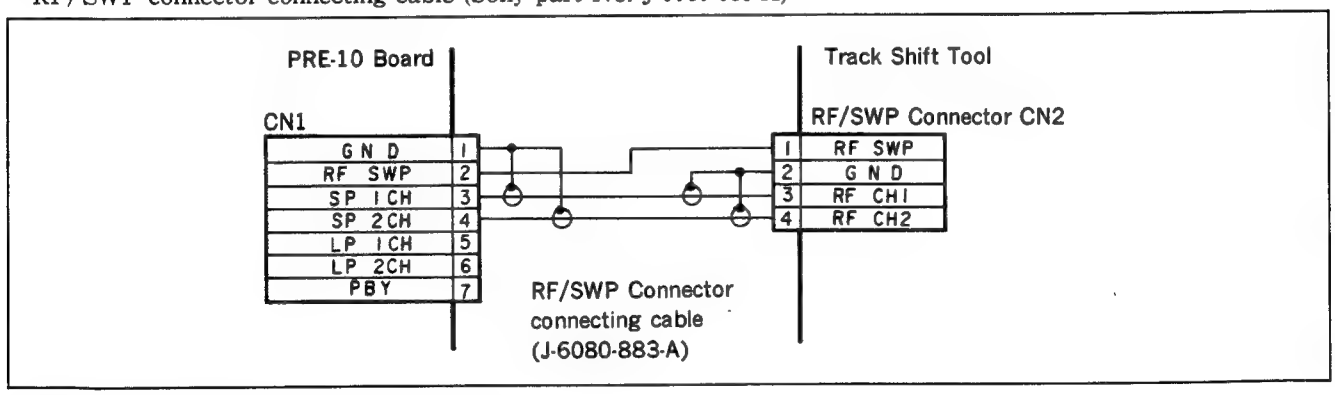


Fig. 6-3 RF/SWP connector connection

6-b. Preparation for Adjustment

A Clean the tape contacting surface of tape run mechanism (Tape guides, Drum ass'y, Capstan, Pinch roller) with wiping cloth moistened with cleaning fluid. Then clean them again a few times with dry cloth.

Note: For cleaning of Upper drum, press the wiping cloth gently, without moving the wiping cloth, but rotate the upper drum for cleaning.

B Oscilloscope connection :
scope channel-1 : Track Shift Tool check pin CH-2
external trigger : Track Shift Tool check pin RF/SWP.

C (1)Playback the tracking alignment tape (WR5-1NP). Check to see that RF wave shape is flat in both entrance side and exit side of drum (as shown in Fig.6-4 (a)).

(2)**For S/N 10001 thru. 10340**
Set switch S401-3 to ON on SST-2 board. Set the mode select to EDIT. Set the assemble button to ON. Adjustment is done by RV701. (See Fig. 6-5.)

For S/N 10341 thru. 11380
Set switch S401-3 to ON on SST-2 board. Set the mode select to EDIT. Set the assemble button to ON. Adjustment is done by RV703. (See Fig. 6-5-1.)

For S/N 11381 and later
Set switch S3 on SST-2 board to "PATH". Adjustment is done by RV701. (See Fig. 6-5-2.)

(3)Check to see that RF wave at exit side meets the specifications as shown is Fig. 6-4 (d).
If it does not meet, go to the adjustments that follow.
- If the RF wave shape at entrance side is not flat as shown in Fig. 6-4 (b), go to section 6-2. Tape Entrance Side Adjustment.
- If the RF wave shape at exit side does not meet requirements of above steps (1) and (2) as shown in Fig. 6-4 (c), go to section 6-3. Tape Exit Side Adjustment.

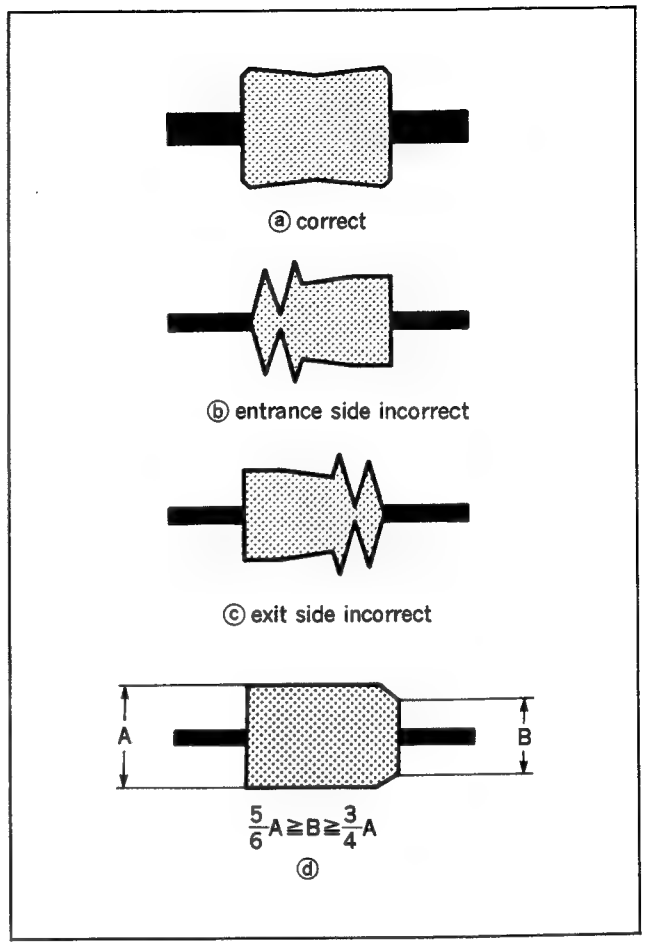


Fig. 6-4 RF wave shape check

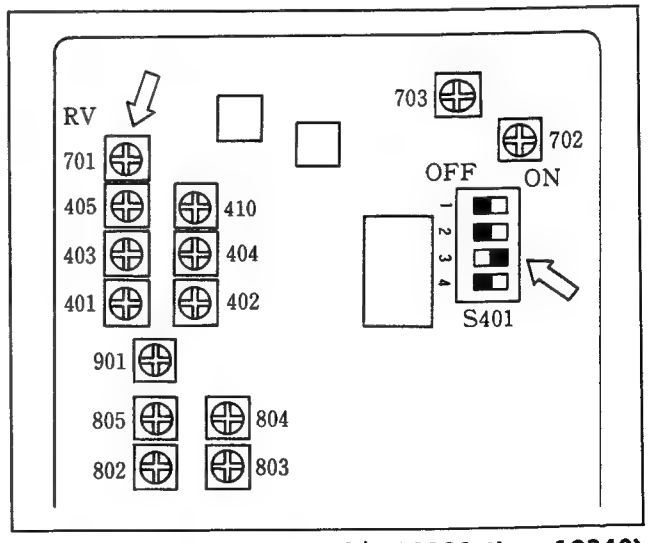


Fig. 6-5 SST-2 board (For S/N 10001 thru. 10340)

(4)**For S/N 10001 thru. 10340**

Tape Run Adjustment will not be executed, carry out the REC Tracking Adjustment and Switching Position Adjustment.

For S/N 10341 thru. 11380

Tape Run Adjustment will not be executed, carry out the REC Tracking Adjustment (only MP tape adjustment using RV703) and Switching Position Adjustment.

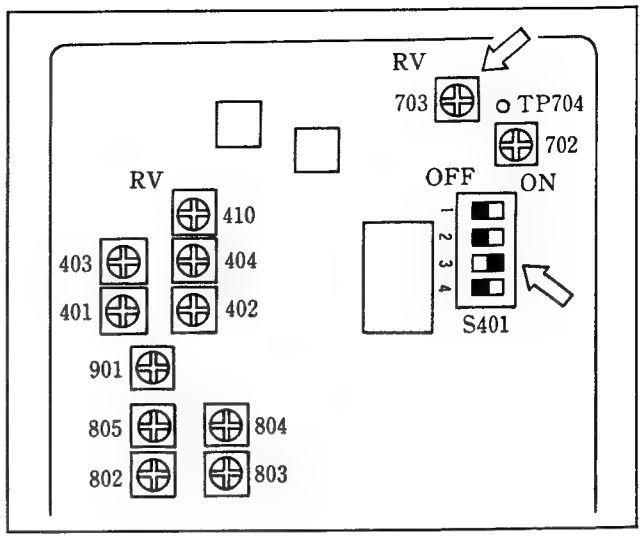


Fig. 6-5-1 SST-2 board
(For S/N 10341 thru. 11380)

For S/N 11381 and later

When the Tape Run Adjustment is not necessary, set switch S3 to "NOR".

The track shift can be controled using RV701 separetely.

This RV701 is used to reduce the RF wave shape amplitude to 2/3, and this potentiometer is provided for service purpose. Then it is not necessary to check the wave shape by shifting the track jn the REC head tracking adjustment.

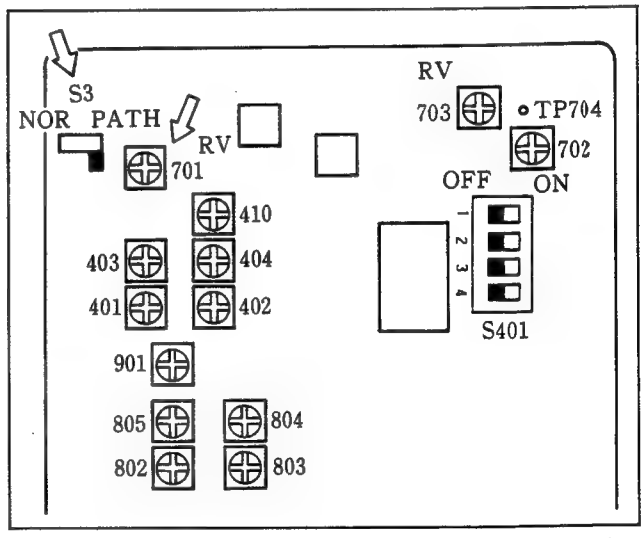
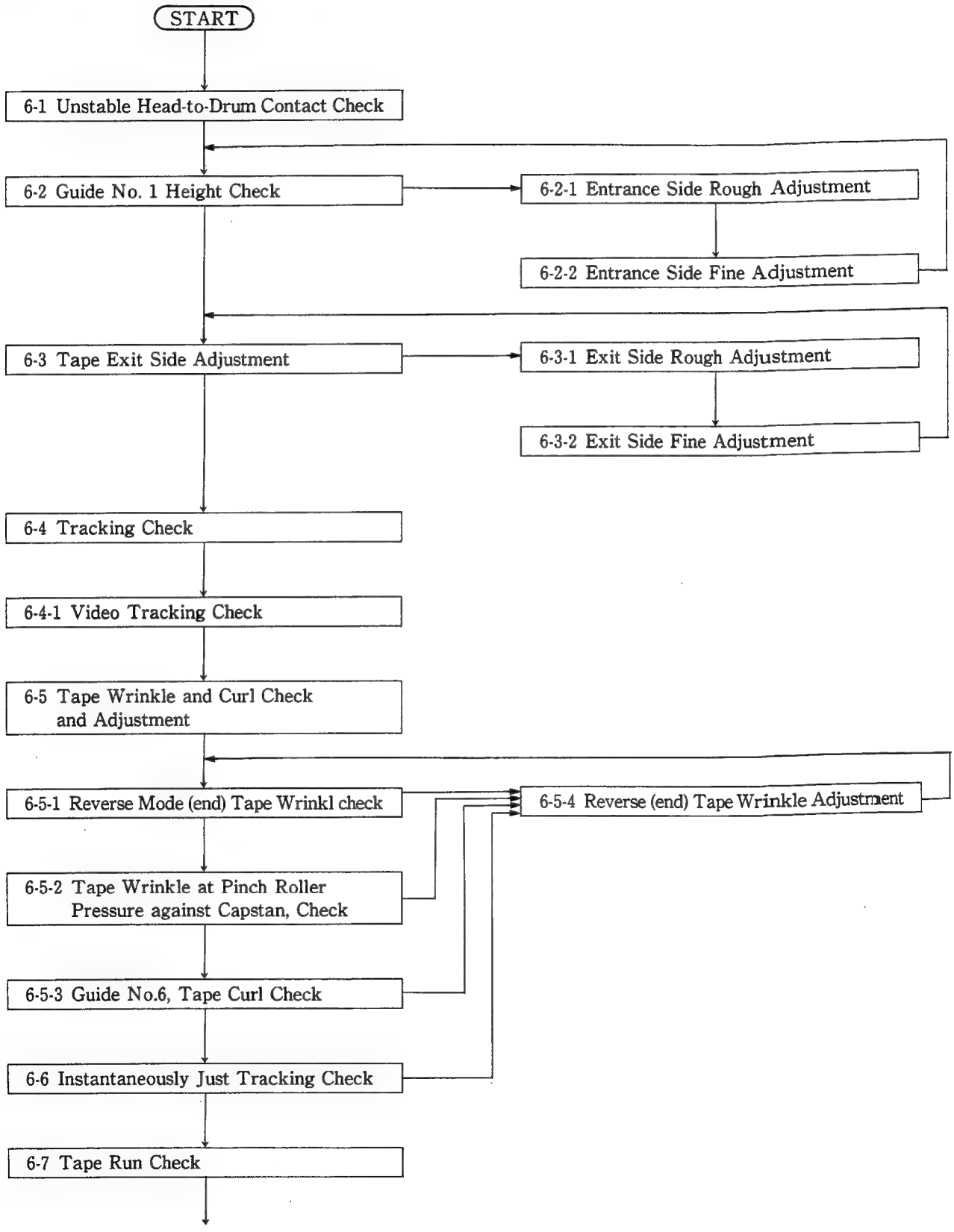
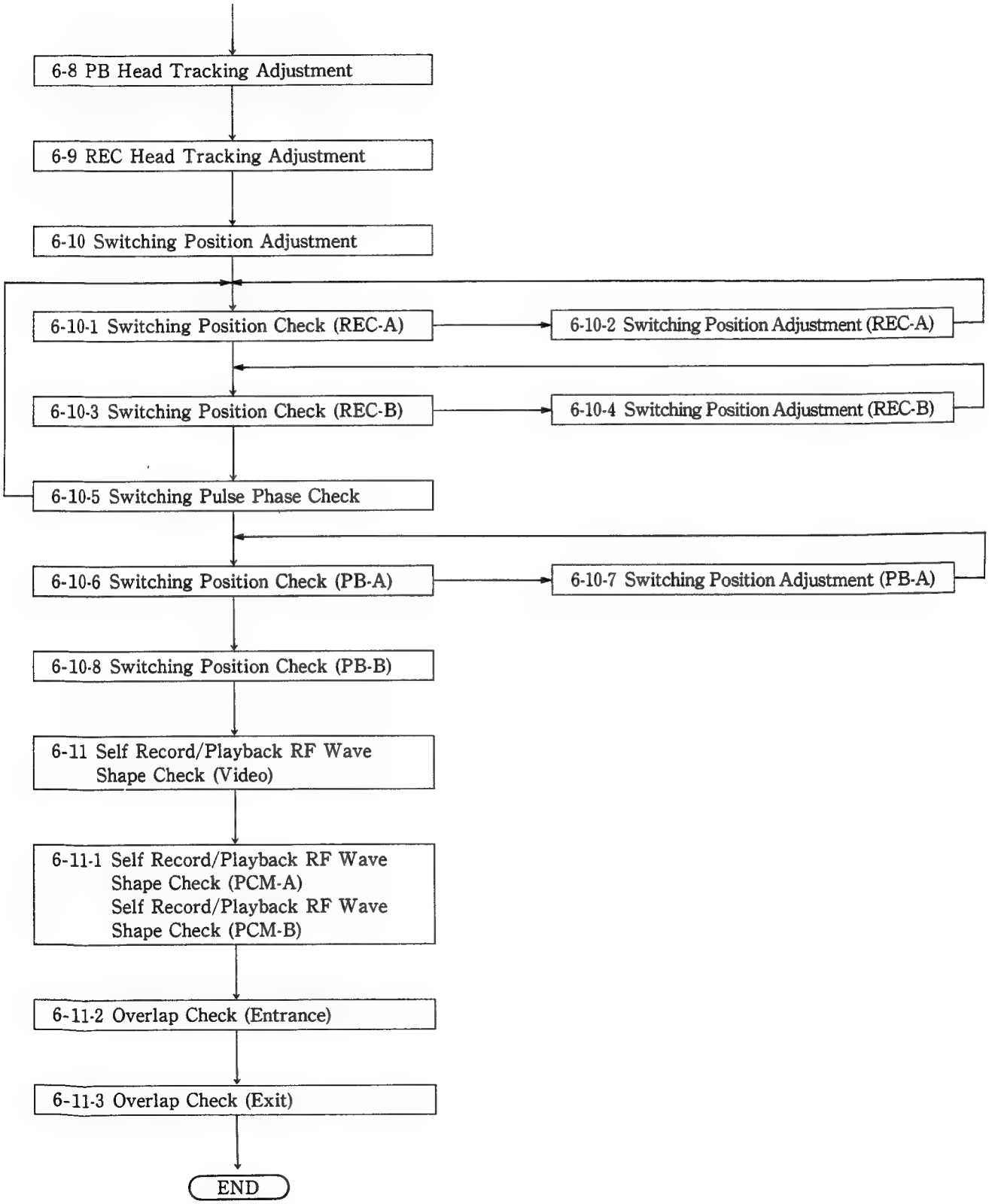


Fig. 6-5-2 SST-2 board (For S/N 10381 and later)

Alignment flow chart




6-8 PB Head Tracking Adjustment
6-9 REC Head Tracking Adjustment
6-10 Switching Position Adjustment
6-10-1 Switching Position Check (REC-A)
6-10-2 Switching Position Adjustment (REC-A)
6-10-3 Switching Position Check (REC-B)
6-10-4 Switching Position Adjustment (REC-B)
6-10-5 Switching Pulse Phase Check
6-10-6 Switching Position Check (PB-A)
6-10-7 Switching Position Adjustment (PB-A)
6-10-8 Switching Position Check (PB-B)
6-11 Self Record/Playback RF Wave Shape Check (Video)
6-11-1 Self Record/Playback RF Wave Shape Check (PCM-A) Self Record/Playback RF Wave Shape Check (PCM-B)
6-11-2 Overlap Check (Entrance)
6-11-3 Overlap Check (Exit)
END

6-1. Unstable Head-to-Drum Contact Check

Check procedure

1) Thread Reference tape WR5-1NP and press [PLAY]
2) Press the portion A at the front side of the Stator Holder, with bamboo stick.
3) Observe wave shape. Remove bamboo stick when wave shape becomes figure (a) of Fig.6-1-1. Check to see that wave shape returns to the original wave shape as the bamboo stick is removed.
4) Repeat steps 2) and 3).
5) Press the portion B at the near side of the Stator Holder with bamboo stick.
6) Observe wave shape. Remove bamboo stick when wave shape becomes figure (b) of Fig.6-1-1. Check to see that wave shape returns to the original wave shape as the bamboo stick is removed.
7) Repeat steps 5) and 6)

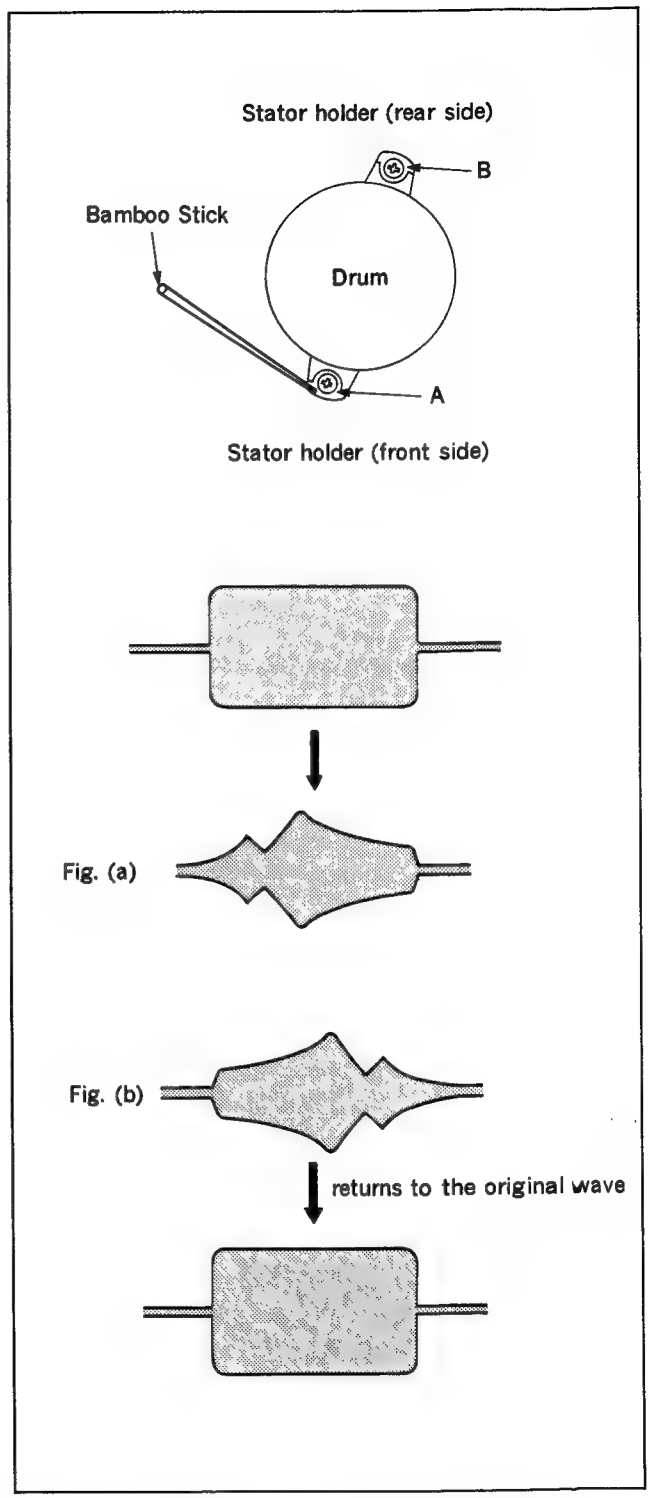


Fig. 6-1-1 Checking the unstable head-to-drum contact

6-2. Guide No.1 Height Check

Basic knowledge

A The guide No.1 has function to adjust the tape free running at entrance side (number of peaks of RF output wave shape).

B This adjustment is executed through Guide No.2.

C This adjustment is executed by playing back the alignment tape (WR5-1NP).

6-2-1. Entrance Side Rough Adjustment

1. Remove fly-wheel referring to section 4-1.

2. Loosen the Guide No.2 lock screw once, and then tighten it gently.

3. Rotate the guide No.2 counterclockwise so that tape does not contact with both upper flange and lower flange. (See Fig.6-2-1.)

Note: Tape guide width between upper and lower flanges of guide No.2 is rather short. Check that tape does not contact with both upper flange and lower flange.
If the guide No.2 is loosened too much, tape will contact with lower flange causing poorer RF wave shape (at entrance) than the correct one. Please take care.

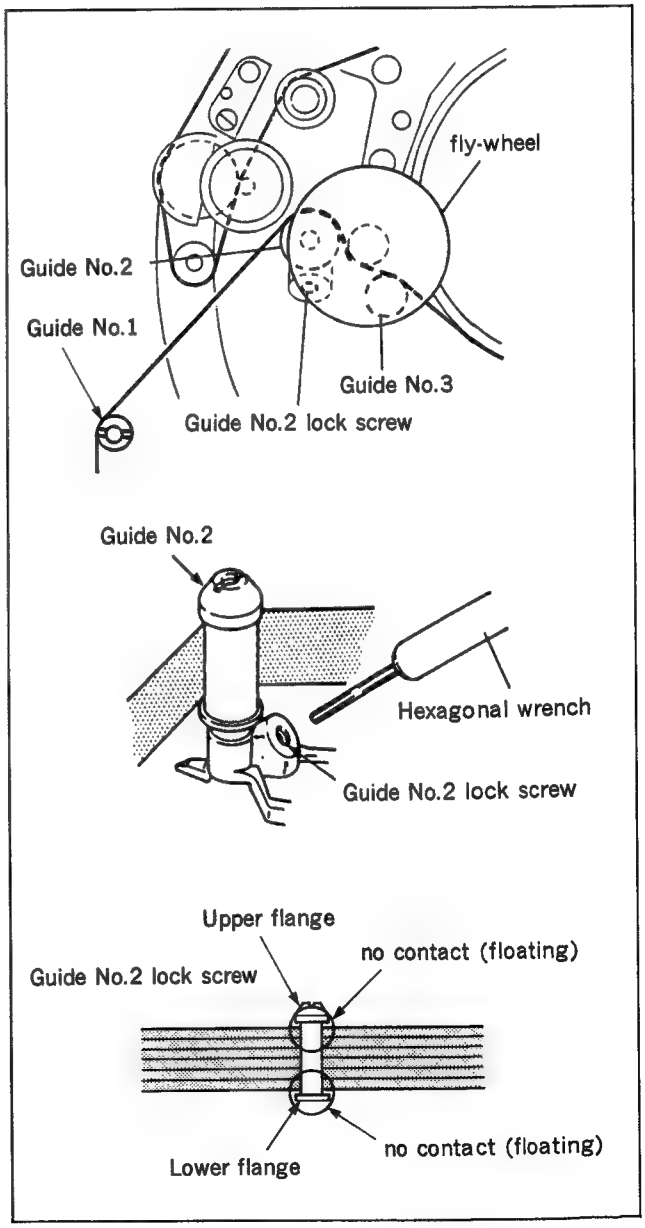


Fig. 6-2-1 Entrance side raugh adjustment (1)

4. Check that entrance side RF wave shape has one thru three peaks in the previous conditions of step 3. If not, continue adjustments as shown below.
   1)When the wave shape in Fig. 6-2-2 (a) has only one peak or less, rotate the height adjusting screw of Guide No.1 in clockwise direction. It causes raising the height of Guide No.1.
   2)When the wave shape in Fig.6-2-2 (b) has more than four peaks or more, rotate the height adjusting screw of Guide No.1 in counterclockwise direction.

Note: When height adjustment is performed, be sure to perform step 3.

specifications: within one peak through three peaks

5. Rotate the Guide No.2 gently in clockwise direction until the entrance side RF wave shape becomes flat.

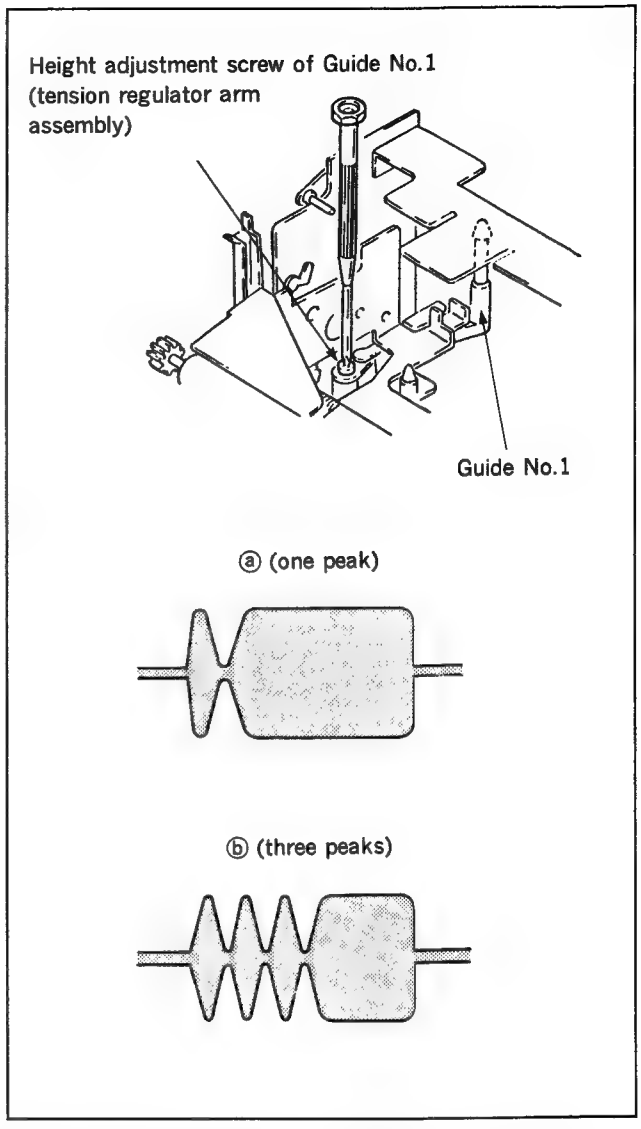


Fig. 6-2-2 Entrance side rough adjustment (2)

6-2-2. Entrance Side Fine Adjustment

1. <u>For S/N 10001 thru. 10340</u>
   Set switch S401-3 on SST-2 board to ON. Set the mode select switch on the control panel to EDIT. Press then ASSEMBLE button. [Lamp lights ON.] Turn RV701 on SST-2 board to counterclockwise direction until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-2-3(a).)

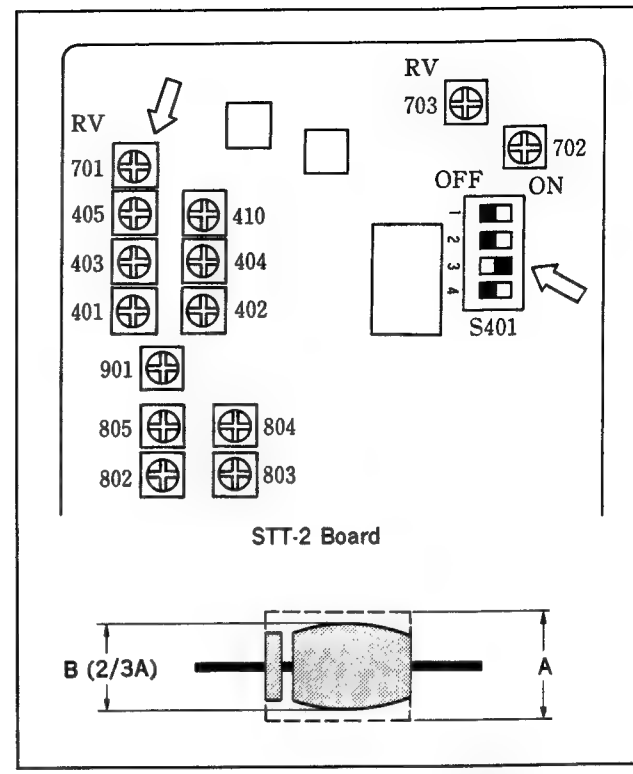


Fig. 6-2-3(a) Entrance side fine adjustment
(For S/N 10001 thru. 10340)

<u>For S/N 10341 thru. 11380</u>
Set switch S401-3 on SST-2 board to ON. Set the mode select switch on the control panel to EDIT. Press then ASSEMBLE button. [Lamp lights ON.] Turn RV703 on SST-2 board to counterclockwise direction until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-2-3(b).)

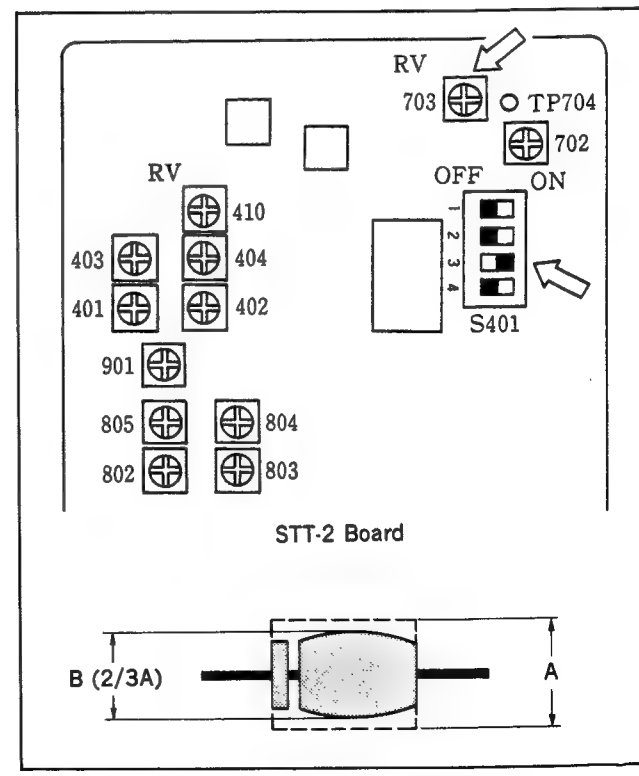


Fig. 6-2-3(b) Entrance side fine adjustment
(For S/N 10341 thru 11380)

For S/N 11381 and later

Set switch S3 on SST-2 board to "PATH".
Turn RV701 on SST-2 board to counterclockwise direction until RF wave shape amplitude is reduced to 2/3 (See Fig. 6-2-3(c).)

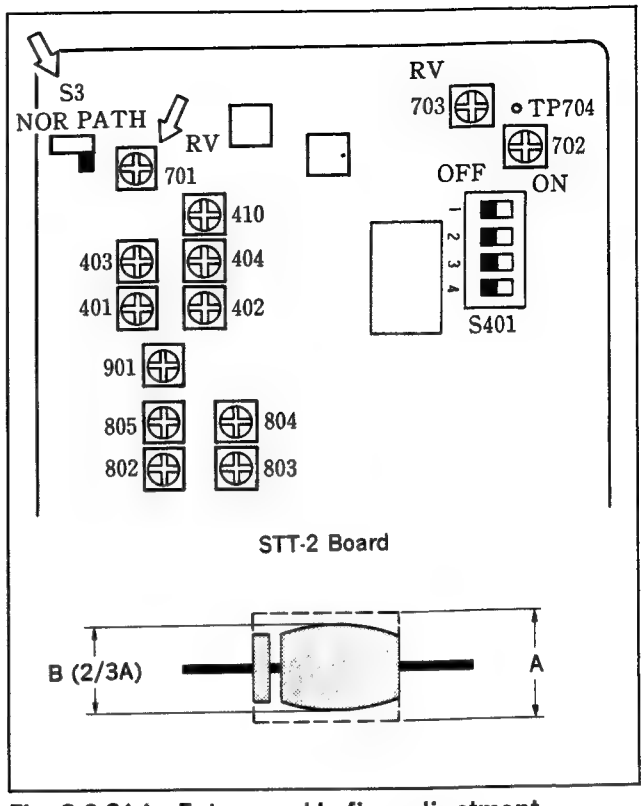


Fig. 6-2-3(c) Entrance side fine adjustment
(For S/N 10381 and later)

2. Rotate the Guide No.2 until entrance side RF wave form meets the requirement, as shown.
Then tighten the Guide No.2 locking screw.

Tightening torque:
0.137×10^{-2} through 0.157×10^{-2} N•m
(1.4 through 1.6 kgf•cm)

3. Check that tape runs without curl at the Guide No.2 upper flange.

4. Install fly-wheel referring to section 4-1.

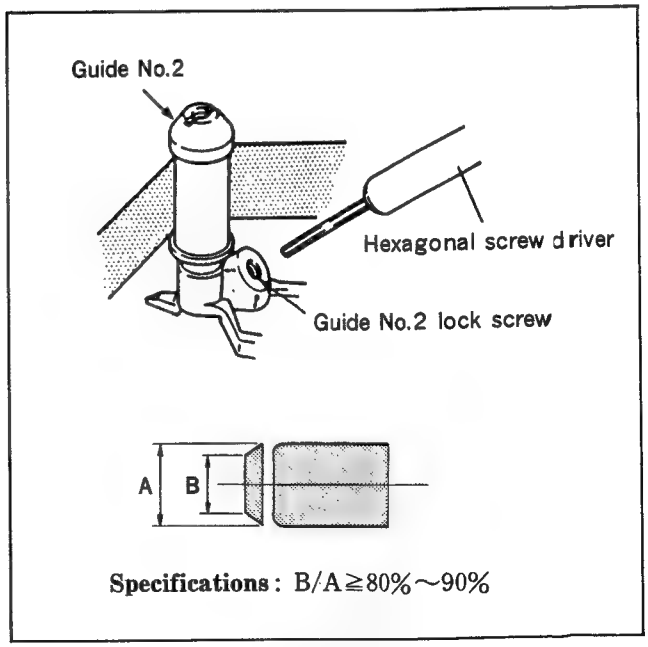


Fig. 6-2-4 No. 2 Guide adjustment

6-3. Tape Exit Side Adjustment

• Tape exit side adjustment is carried out by adjusting the Guides No.4 and No.5.
This adjustment is executed by playing back the alignment tape (WR5-1NP).

6-3-1. Exit Side Rough Adjustment

1. **For S/N 10001 thru. 10340**
Set Switch S401-3 on SST-2 board to ON. Set the mode select switch on the control panel to EDIT. Press then ASSEMBLE button. [Lamp lights ON.] Turn RV701 on SST-2 board to counterclockwise direction until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-2-3(a).)

For S/N 10341 thru. 11380
Set switch S401-3 on SST-2 board to ON. Set the mode select switch on the control panel to EDIT. Press then ASSEMBLE button. [Lamp lights ON.] Turn RV703 on SST-2 board to counterclockwise direction until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-2-3(b).)

For S/N 11381 and later
Set switch S3 on SST-2 board to "PATH". Adjustment is done by RV701 (See Fig. 6-2-3(c).)

2. Rotate the Guides No.4 and No.5 counterclockwise until tape does not run in contact with upper flange. (See Fig. 6-3-1)

3. Execute the tape free running adjustments until wave shape meets the specifications. (See Fig.6-3-2.)

Specifications: Peaks; 2 peaks to 3 peaks.

1)Loosen the Guide No.5 locking screw.
2)When the wave shape in Fig.6-3-2 has two peaks or less, rotate the height adjusting screw of Guide No. 5 in clockwise direction. It causes raising the height of Guide No.5.
3)When the wave shape has four peaks or more, rotate the height adjusting screw of Guide No.5 in counterclockwise direction. It causes lowering the height of Guide No.5.
4)Tighten the Guide No.5 locking screw.
(Do not tighten too much.)
5)Repeat steps 1) through 4) again.

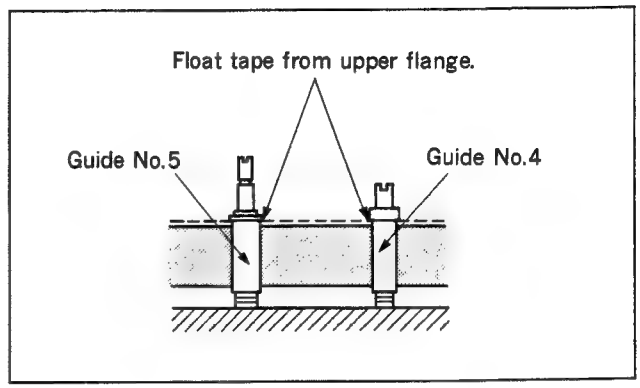


Fig. 6-3-1 Guides No.4 and No.5 adjustment

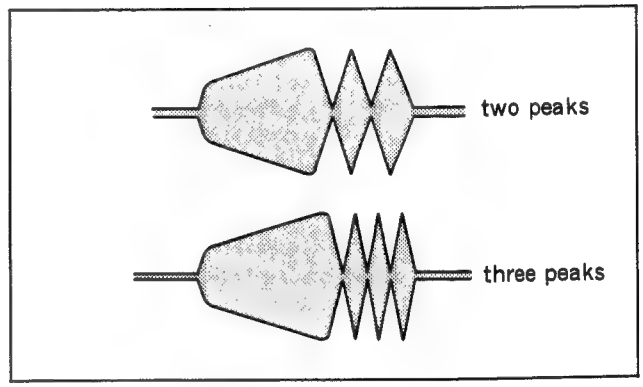


Fig. 6-3-2 Specified wave shape

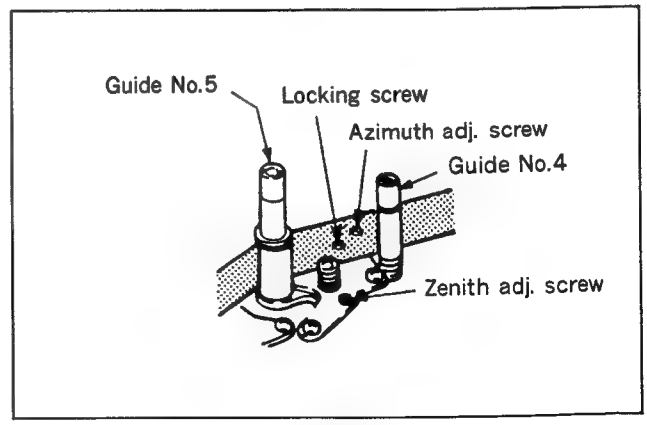


Fig. 6-3-3 Guide No.5 adjustment

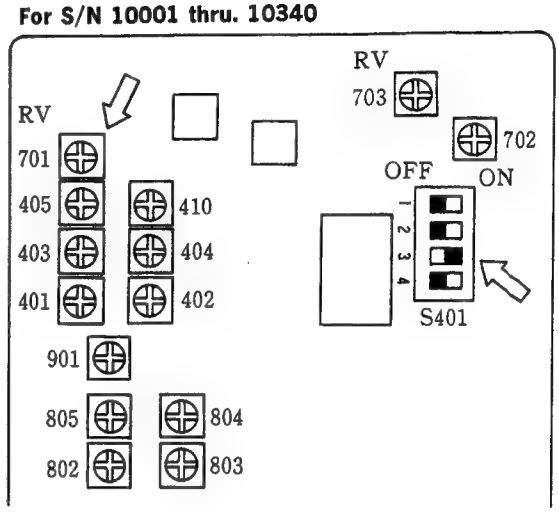
4. Rotate the Guide No.5 in clockwise direction so that exit side wave shape becomes flat as possible.

Note: During this adjustment , never touch nor rotate the azimuth adjusting screw.

6-3-2. Exit Side Fine Adjustment

1. <u>For S/N 10001 thru. 10340</u>
   Set switch S401-3 on SST-2 board to ON. Set the mode select switch on the control panel to EDIT. Press then ASSEMBLE button. [Lamp lights ON.] Turn RV701 on SST-2 board to counterclockwise direction until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-3-4 (1).)

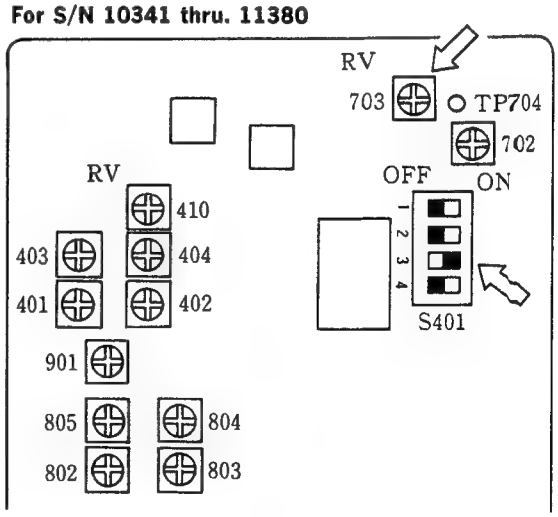
For S/N 10001 thru. 10340



SST-2 board

<u>For S/N 10341 thru. 11380</u>
Set switch S401-3 on SST-2 board to ON. Set the mode select switch on the control panel to EDIT. Press then ASSEMBLE button. [Lamp lights ON.] Turn RV703 on SST-2 board to counterclockwise direction until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-3-4 (1).)

For S/N 10341 thru. 11380



STT-2 Board

For S/N 11381 and later

Set switch S3 on SST-2 board to "PATH".
Turn RV701 on SST-2 board to counterclockwise direction until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-3-4 (1).)

2. Lower the height of Guide No.5 so that wave shape decreases by 4% from flat wave shape. (See Fig. 6-3-4 (2).)

3. Lower the height of Guide No.4 so that wave shape decreases by 5% from B wave shape. (See Fig.6-3-4 (3).)

4. **For S/N 10001 thru. 10340**
   Adjust RV701 on SST-2 board until wave shape has the maximum amplitude. (See Fig. 6-3-4 (4).)

   For S/N 10341 thru. 11380
   Adjust RV703 on SST-2 board until wave shape has the maximum amplitude. (See Fig. 6-3-4 (4).)

   For S/N 11381 and later
   Adjust RV701 on SST-2 board until wave shape has the maximum amplitude. (See Fig. 6-3-4 (4).)

5. Check that tape runs without curl and wrinkle at the upper flange of Guide No.4.

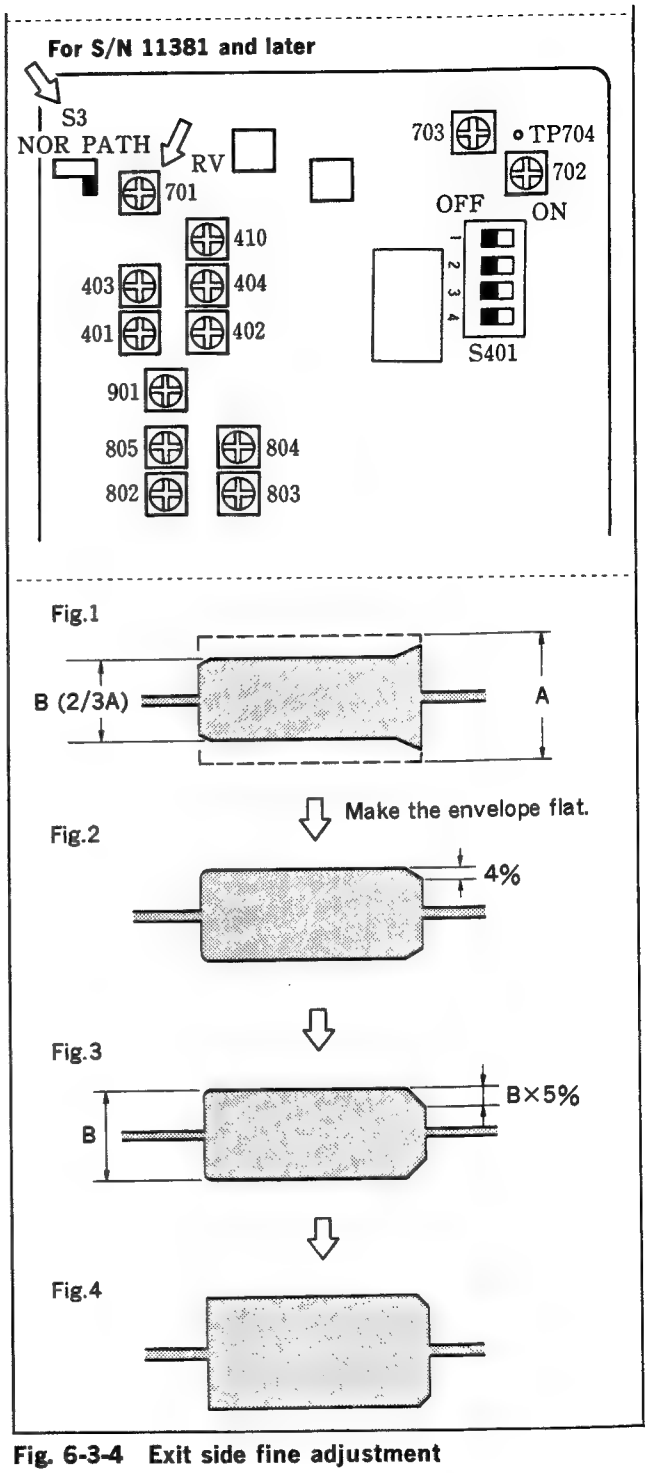


Fig. 6-3-4 Exit side fine adjustment

6-4. Tracking Check

6-4-1. Video Tracking Check

1. Playback the tracking alignment tape (WR5-1NP).

2. **For S/N 10001 thru. 10340**
   Turn RV701 on SST-2 board until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-4-1 (1).)

   For S/N 10341 thru. 11380
   Turn RV703 on SST-2 board until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-4-1 (1).)

   For S/N 11381 and later
   Set switch S3 on SST-2 board to "PATH".
   Turn RV701 on SST-2 board until RF wave shape amplitude is reduced to 2/3. (See Fig. 6-4-1 (1).)

3. 1)Confirm that the minimum amplitude (Emin) of RF wave shape is more than 75% of the maximum amplitude (Emax). (See Fig.6-4-1(2).)

   Specifications : $\frac{E_{MIN}}{E_{MAX}} \geqq 75\%$

   2)Confirm that the RF waveform at the Entrance side (D_{MIN}) is 75% more than the RF waveform at the Switching Pulse position (E_{MIN}).

   Specifications : $\frac{D_{MIN}}{E_{MIN}} \geqq 75\%$

4. RF envelope fluctuation at both entrance and exit sides is less than the specified value, as shown in Fig.6-4-1 (3).

5. Put the unit into reverse mode. Check that noise pitch has equal interval. (Fig.6-4-1 (3).) If it does not have equal interval, continue adjustment as follows.

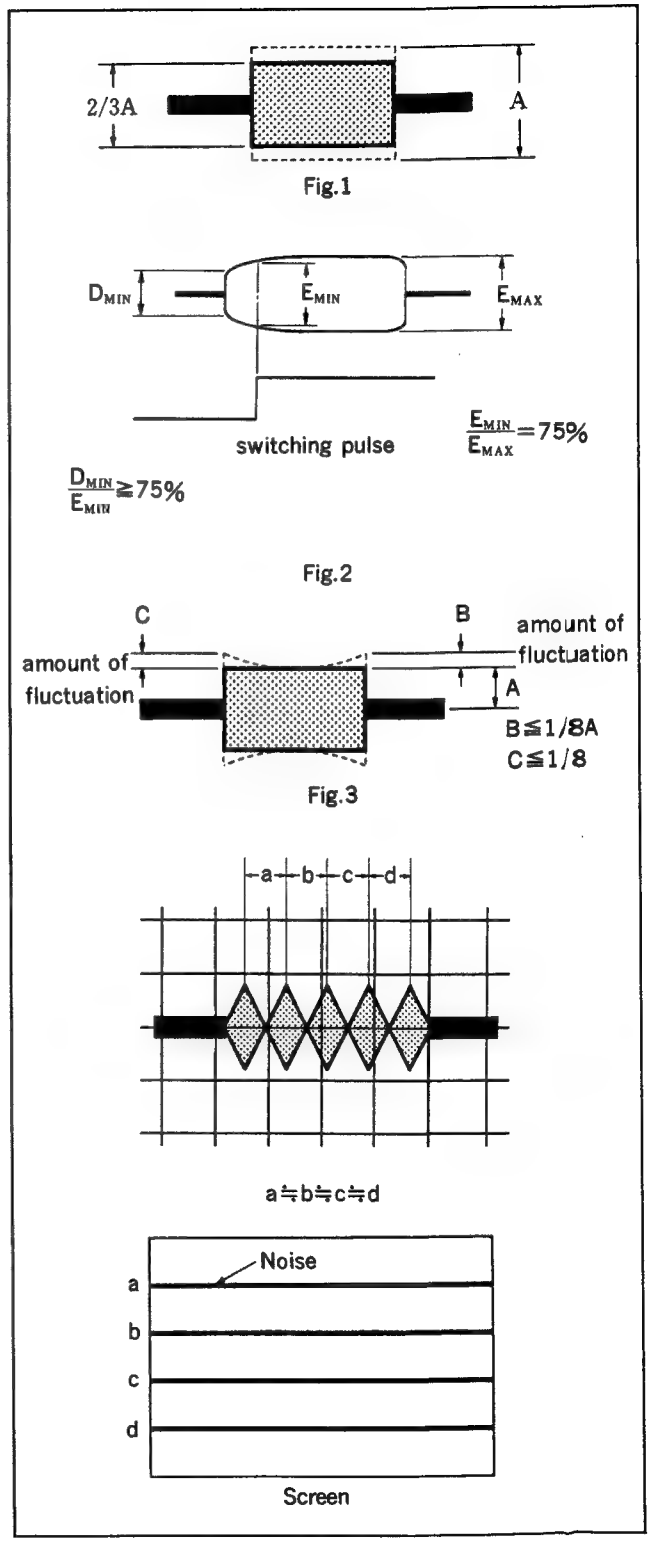


Fig. 6-4-1 Tracking check

[When noise pitch is narrower at tape entrance (on top of screen)]
See Fig. 6-4-2.

5-1. Put the unit into playback mode and check that RF wave shape is flat.

5-2. Make the Guide No.1 height adjustment referring to section 6-2-1.
After completion of the adjustment, execute the tracking check referring to section 6-4-1.

[If wave shape is not flat, proceed to the following adjustment]

5-3. Make the Guide No.2 height adjustment referring to section 6-2-2.
After completion of the adjustment, execute the tracking check referring to section 6-4-1

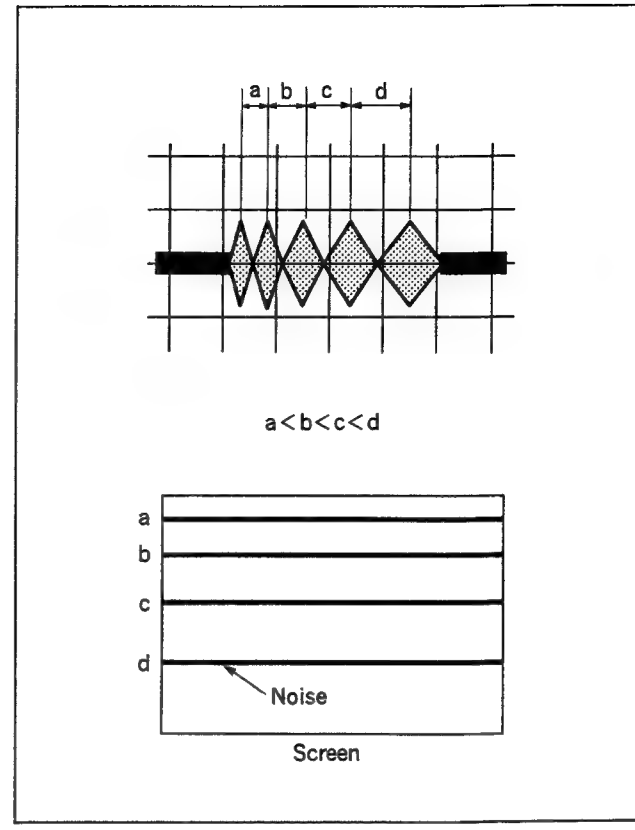


Fig. 6-4-2 Noise pitch at tape entrance

[When noise pitch is narrower at tape exit (on bottom of screen)]
See Fig. 6-4-3.

5-4. Put the unit into playback mode and execute the height adjustment of Guides No.4 and No.5.
After completion of the adjustment, perform the tracking check referring to section 6-4-1 to check that RF wave shape meets the specifications.

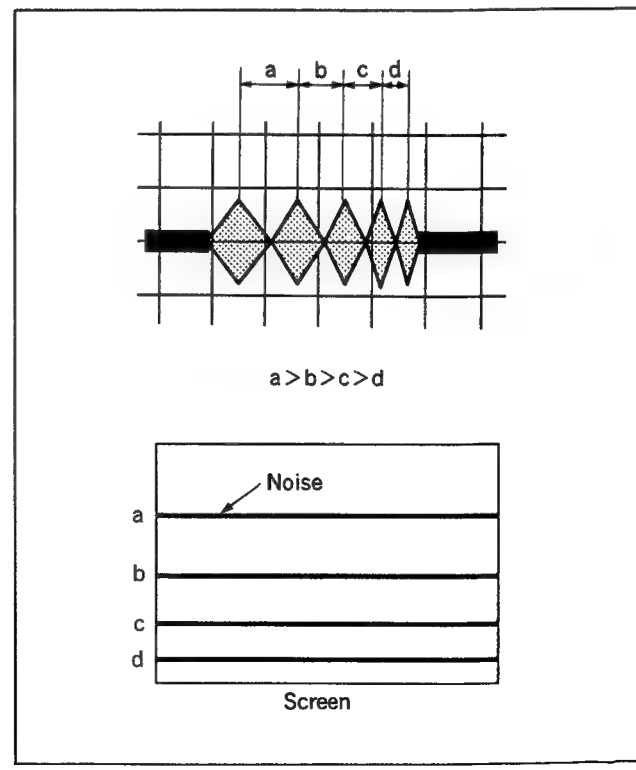


Fig. 6-4-3 Noise pitch at tape exit

[When noise pitch is wider at tape exit (on bottom of screen)]

See Fig. 6-4-4 (1).

5-5. Put the unit into playback mode and check that RF wave shape is flat.

5-6. Rotate the lower toothed wheel using Guide No.6 lock driver, in counterclockwise direction to loosen it. (See Fig.6-4-4 (2).)

5-7. Adjust height of Guide No.6, by rotating the Guide No.6.

Note: If Guide No.6 is raised too high, tape wrinkle will result at portion-A between capstan and Guide No.5. So check for tape without wrinkle. (See Fig.6-4-4 (3).)

5-8. Rotate the lower toothed wheel using Guide No.6 lock driver, in clockwise direction to lock it. (Rotate the lower toothed wheel until it contacts with lower flange of Guide No.6, and rotate about 10 degrees more to tighten.)
After completing the adjustment, perform the tracking check referring to section 6-4-1.

[If noise pitch is not flat.]

5-9. Adjust the height of Guides No.4 and No.5 referring to section 6-3-2.
After completing the adjustment, perform the tracking check referring to section 6-4-1.

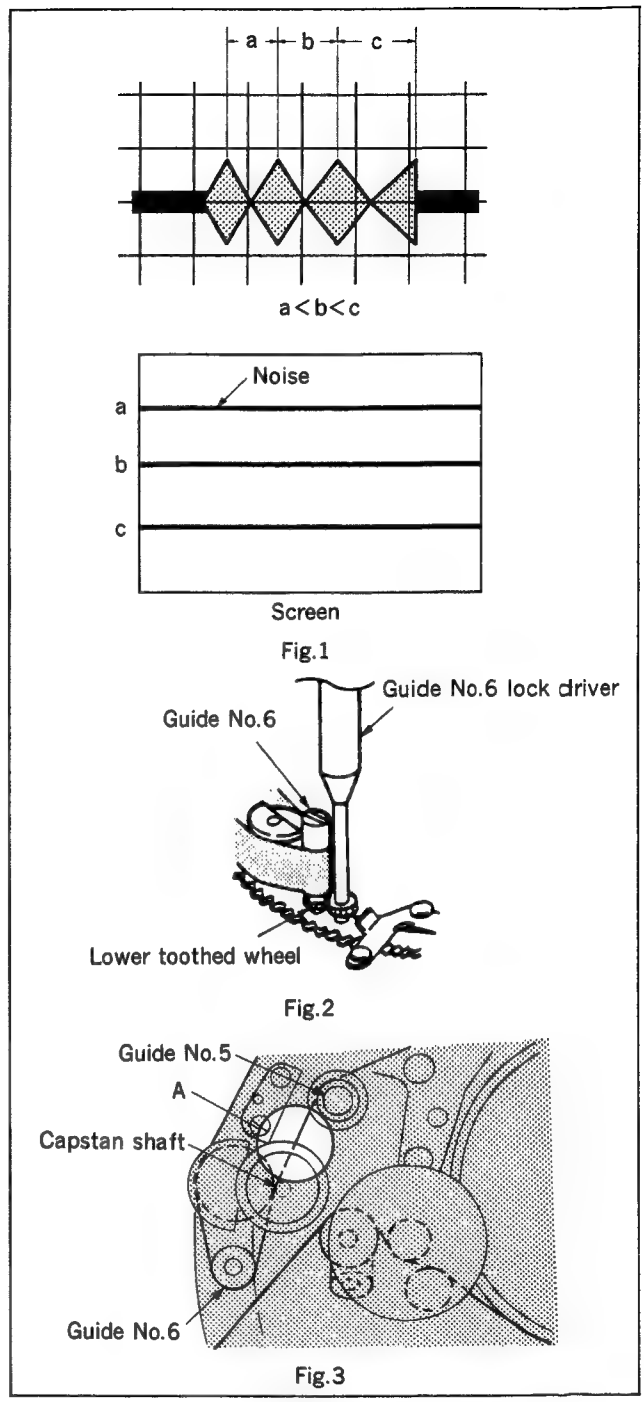


Fig. 6-4-4 Exite side noise pitch adjustment

6-5. Tape Wrinkle and Curl Check and Adjustment

Basic knowldge

- Thread a commercially available tape. Use the tape end or tape beginning. Check by visual view that tape produces no tape wrinkle nor tape curl. So called tape end and tape beginning mean the conditions shown in Fig.6-5-1.

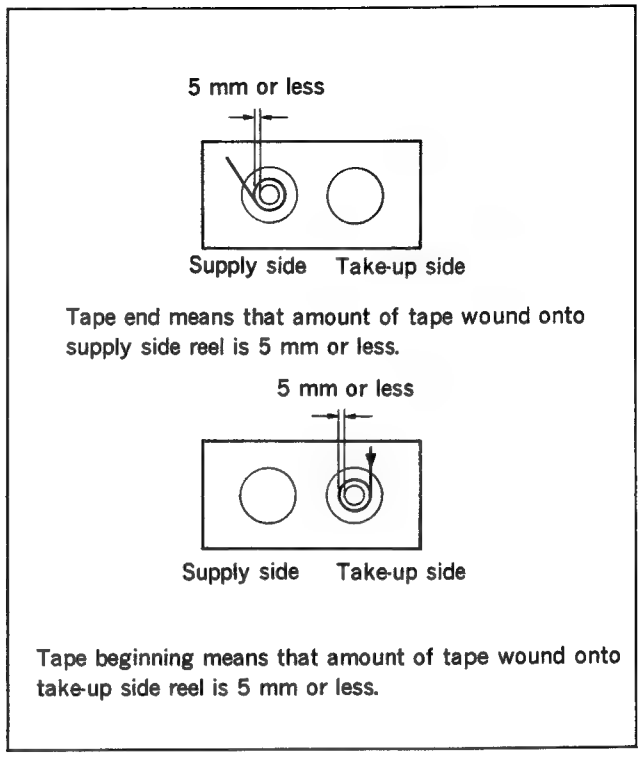


Fig. 6-5-1 Tape end or tape beginning

6-5-1. Reverse Mode (end) Tape Wrinkle Check

1. Thread a commercially available tape type E6-120HME. Use the tape, and put the unit into search-reverse x1 mode.

2. Check that tape has no wrinkle between the Guide No.5 and pinch roller at all times. (See Fig.6-5-2.)

3. Repeat PLAY and search reverse viceversa, and check that tape has no wrinkle at all times. Confirm it more than two times.

4. When viewing the portion-A from the top, tape should not have extra tape loop at portion-A. It extra loop of tape is visible, execute the adjustment of section 6-5-4.

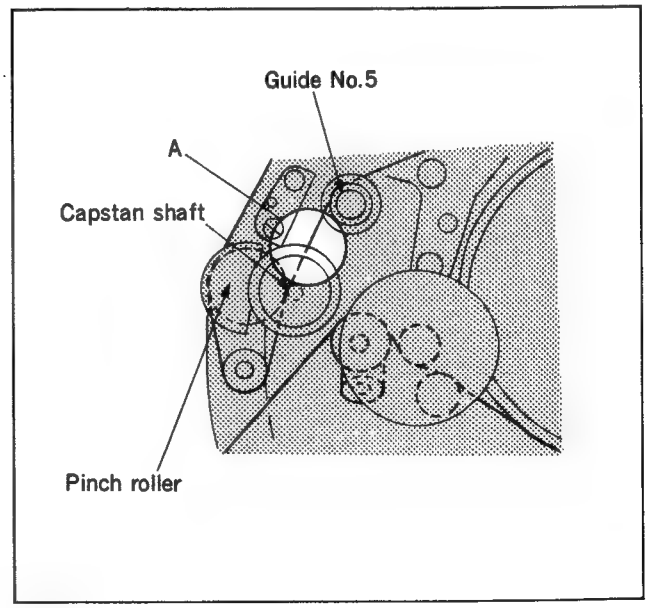


Fig. 6-5-2 Tape wrinkle check

6-5-2. Tape Wrinkle at Pinch Roller Pressure against Capstan, Check

1. Thread a commercially available tape (type P6-120HMP).

2. Observe tape at just put the unit into the following mode listed below. Observe that tape wrinkle is not kept existing between Guide No.5 and pinch roller, due to pinch roller pressure against capstan.
   1)threading → PLAY
   2)REW → PLAY
   3)F.FWD → PLAY

specifications (A) : Tape wrinkle due to pinch roller pressure against capstan disappears within two seconds in each mode.

3. Press [EJECT] to eject the tape.

6-5-3. Guide No.6, Tape Curl Check

1. Thread a commercially available tape type P6-120HMP. Use the tape beginning. Put the unit into search reverse x -1 mode.

2. Check that curing of tape edge at bottom flange of Guide No.6 meets the following specifications.

specifications

a. If tape curl fluctuates, it is considered NG (no good).

b. When curl does not fluctuates even though tape produces curling. Including small vibration : OK.

c. When tape curl fluctuates only immediately after starting reverse mode or only after stopping from reverse mode: OK.

6-5-4. Reverse (end) Tape Wrinkle Adjustment

1. Rotate the Guide No.6 lock driver in counter-clockwise direction to loosen the locking screw of Guide No.6. (See Fig.6-5-3.)

2. • If tape wrinkle exists at bottom edge of tape, rotate the Guide No.6 in clockwise direction.
   • If tape creasing exists at top edge of tape, rotate the Guide No.6 in counterclockwise direction.

3. Rotate the Guide No.6 lock driver in clockwise direction to tighten the height locking screw of Guide No.6.

Nete 1: Rotate the Guide No.6 lock driver until the height locking screw contacts with lower flange of Guide No.6, and rotate about 10 degrees more to tighten.

2: If height of Guide No.6 is decreased too low, tape wrinkle can occur during REW mode. Check that tape has no wrinkle in REW mode.

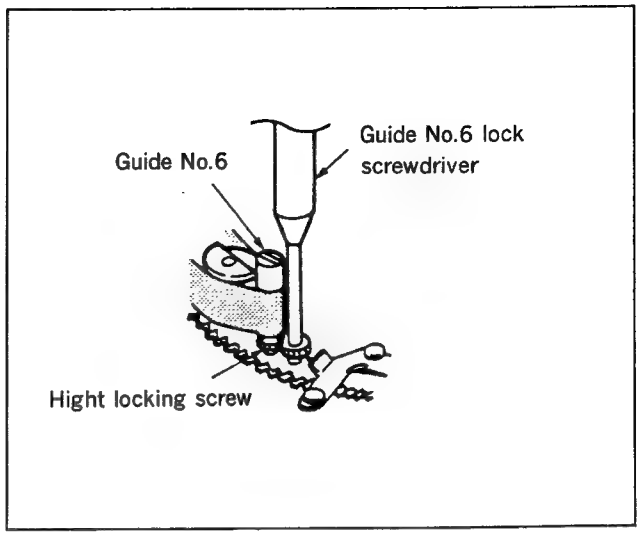


Fig. 6-5-3 Guide No.6 height adjustment

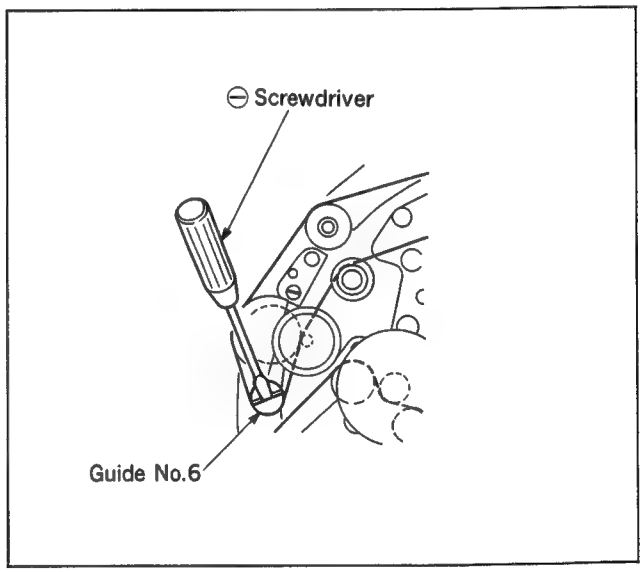
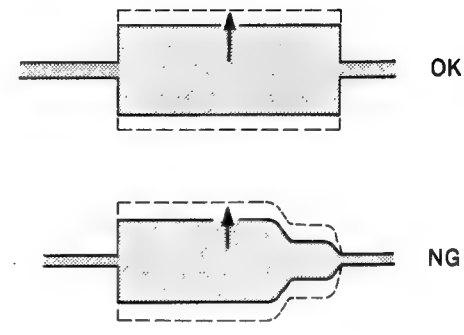


Fig. 6-5-4 Guide No.6 adjustment

6-6. Instantaneously Just Tracking Check

1. Thread alignment tape (WR5-1NP). Play it back starting from REW ×1 mode.
   Observe RF envelope in playback from threading-completed position, and also playback from FF mode.
   Check to see that RF wave shape makes flat instantaneously while maintaining horizontally flat envelope (see specifications).

Specification :



horizontally flat envelope

2 (1)If RF wave shape does not make flat instantaneously while maintaining horizontally flat envelope, go to the adjustment below. (Fig.6-6-1.)

If noise is seen at exit side (bottom of screen) when the unit put into the playback mode from threading-completed condition. (Fig.6-6-1 (1))

(2) Check that FWD hold-back tension is not too low.

If it is too low,

Re-adjust it referring to section 5-5 FWD Hold-back Tension Adjustment

If it is correct,

Rotate the pinch roller azimuth adjusting screw about 5 degrees in clockwise. Check the RF wave shape. Adjust it by incrementing the 5 degree clockwise rotation and check at each rotation. (Fig.6-6-1 (2))

If noise is seen at exit side (bottom of screen) when the unit put into the playback from REV mode. (Fig.6-6-1 (1))

(3) Loosen by rotating the height locking screw in counterclockwise direction, using Guide No.6 locking driver. (Fig.6-6-1 (3))

(4) Adjust height of Guide No.6 by rotating it.

Note: If Guide No.6 is raised too high, tape wrinkle occurs between capstan and Guide No.5. (Fig. 6-6-1 (2) portion-A) Check there is not tape wrinkle.

If noise is seen at exit side (bottom of screen) when the unit put into the playback from FF mode. (Fig.6-6-1 (1))

(5) Check that FWD hold-back tension is not too low.

If it is too low,

Re-adjust it referring to section 5-5 FWD Hold-back Tension Adjustment

If it is correct,

Rotate the pinch roller azimuth adjusting screw about 5 degrees in clockwise. Check the RF wave shape. Adjust it by incrementing the 5 degree clockwise rotation and check at each rotation. (Fig.6-6-1 (2))

Note: After completion of adjustment, be sure to check the wave shape of playback mode after threading-completion.

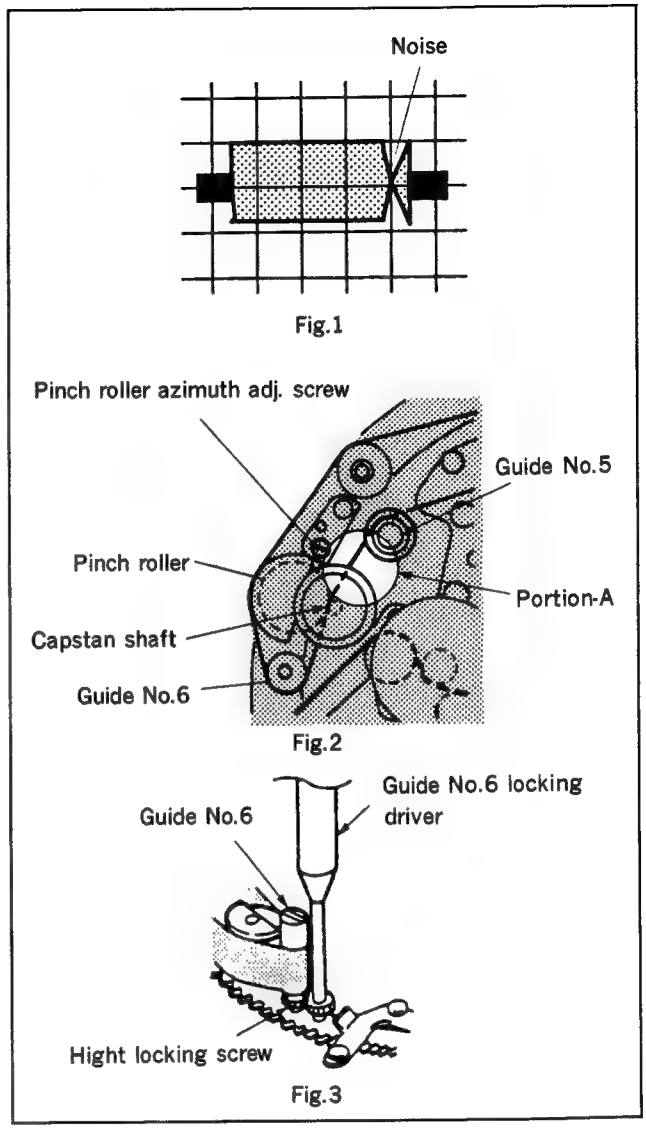


Fig. 6-6-1 Checking just put into playback mode

6-7. Tape Run Check

Check procedure

1. Thread the commercially available tape (P6-120HMP), and put the unit into PLAY mode.

2. Confirm the tape curl at the flange of each guide satisfies specifications (the points where the arrows indicate).

Specifications (1)
The tape curls at each guide should be less than the following value in
<PLAY, REV mode>

Guide	Tape top curl	Tape bottom curl
No.1	0	0.3 mm or less
No.2	0.3 mm or less	0
No.4	0.3 mm or less	0
No.5	0.3 mm or less	0
No.6	0	0.3 mm or less

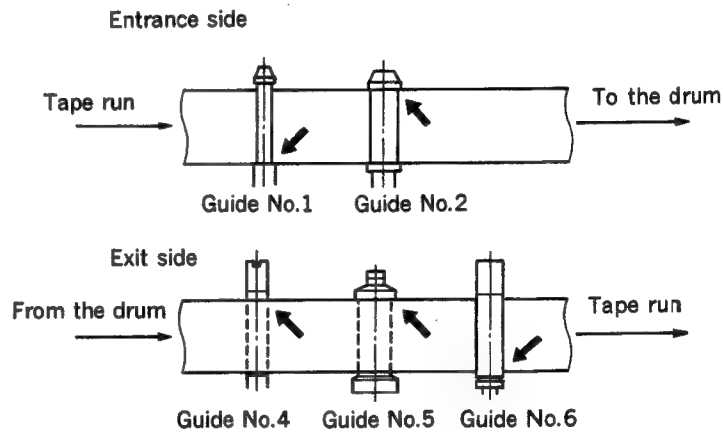


Fig. 6-7-1 Tape Run Check

3. Check there is no tape curl at the drum entrance and drum exit.

4. Put the unit into SEARCH FWD x 9 mode and check that the tape curl at the flange of each guide satisfies the specifications (1).

5. Similarly, put the unit into SEARCH REV x 7 mode, and check the tape curl at the flange of each guide satisfies the specifications (1).

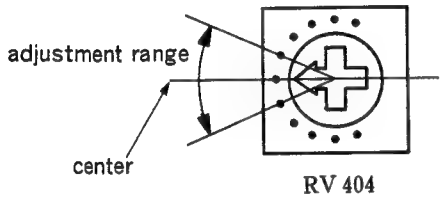
6. Press [REW], and check the tape curl at each block. Press [F FWD], and check the tape curl at each block. Check the tape curl of each block satisfies the specifications (2).

Specifications (2)

Guide	Flange	Specifications
No. 1	Top	0
	Bottom	0.2 mm
No. 2	Top	0.2 mm
No. 4	Top	0.2 mm
No. 5	Top	0.2 mm
No. 6	Bottom	0.2 mm

6-8. PB Head Tracking Adjustment

1. Set the switch S401-3 on the SST-2 board to ON.
2. Play back the Alignment tape (WR5-1NP).
3. Maximize the amplitude of the RF wave shape by using RV404 on SST-2 borad, and adjust RV404 so that the indicated position is within the range of ±1 scale at the mechanical center of the potentiometer.



For S/N 10001 thru. 10340

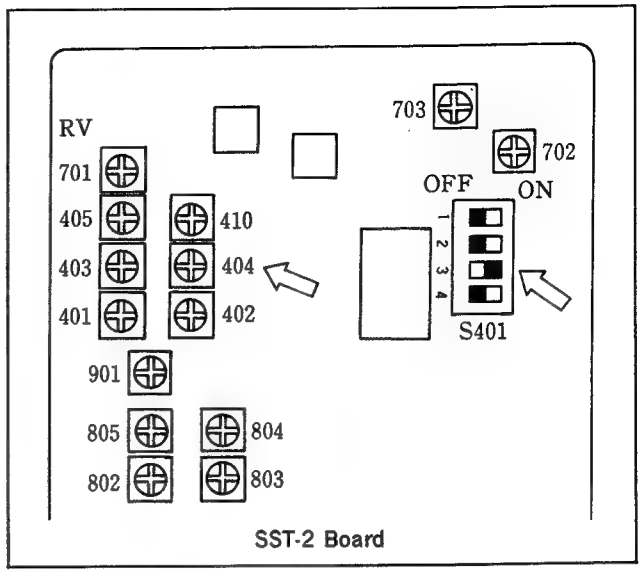


Fig. 6-8-1 PB Head tracking adjustment

For S/N 10341 and later

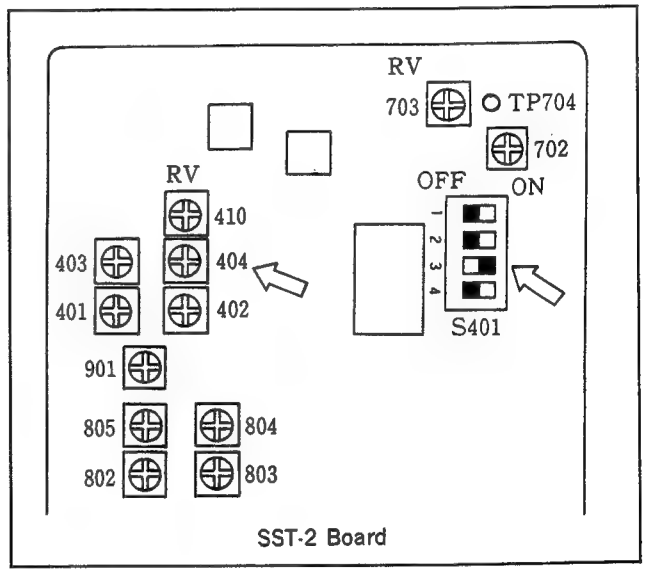


Fig. 6-8-2 PB Head tracking adjustment

6-9. REC Head Tracking Adjustment

For S/N 10001 thru. 10340

REC Head Tracking Adjustment is the most important adjustment for the precision of the video tracking under video insert mode. In the 8 mm video format, the tracking information is superimposed on the video track, then the tracking information is rerecorded using REC heads under the video insert mode.
When magnetic fringing phenomenon of the REC heads or delicate tracking error occures, tracking will be getting shift because of above reason by repeating the video insert operations. To minimize this tracking shift, more precise REC head tracking adjustment is essential. Give more attention to this adjustment.

1. Thread a commercially available tape type P6-120HMP. Put the unit into REC mode about one minute without suppling video signal, and rewind this portion of the tape.

2. Disconnect a connector CN502 on VRA-4 board, and connect 9-pin side of the REC head PB harness (J-6269-000-A) to this position. Connect the 6-pin connector on the other end of the harness to CN512 on PRE-10 board (refer to Fig. 6-9-1).

3. Set switch S401-1 on SST-2 board to ON. (Also switch S401-3 should be ON.)

4. Set the mode select switch to the EDIT side and press the ASSEMBLE button. [Lamp lights ON.]

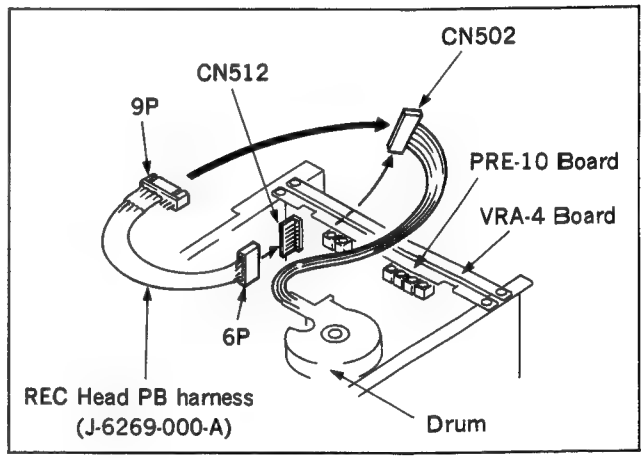


Fig. 6-9-1 Connection of REC head PB harness

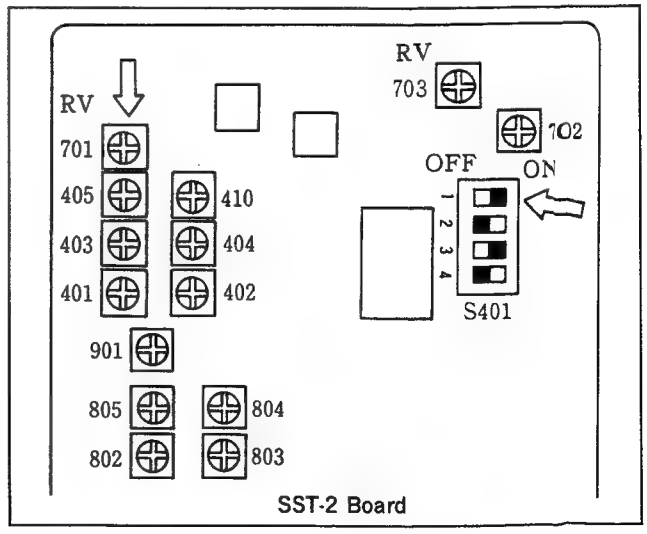


Fig. 6-9-2 REC head tracking adjustment

5. Play back the recorded portion at step-1 of the tape, maximize the RF wave shape (video center portion) by using RV701 on SST-2 board. (See Fig. 6-9-3 (a).)

6. Turn RV701 to counterclockwise direction, and confirm the RF wave shape decreases. (See Fig. 6-9-3 (c).)

7. Turn again RV701 to clockwise direction, and stop the turning just before the maximum amplitude of the wave shape. (See Fig. 6-9-3 (b).)
(**NOTE**: The RF wave shape changes with a little amount of delay because of AFT delay response, then turn slowly RV701.)

Confirmation of tracking adjustment
To confirm that RV701 adjustment is performed correctly, perform the video insert repeatedly as the following procedures.

8. Disconnect the REC head PB harness, connect the REC harness of the drum to CN502 on VRA-4 board, and PB harness of the drum to CN512 on PRE-10 board.

9. Connect the oscilloscope as follows.
CH1 : TP4/PRE-10 board (PCM RF)
CH3 : TP7/PRE-10 board (TRIGGER)

10. Thread a commercially available tape type P6-120HMP. Put the unit into REC mode about 15 seconds.

11. Put the unit into REV search mode, and rewind the tape to the recording start point.
Set the mode select switch to the EDIT side and press the VIDEO INSERT button (VIDEO LED lights ON). Set the time counter select switch to Time Code.

12. Press the PLAY button from the 0 second point, and press the PLAY and EDIT buttons simultaneously to enter the video insert mode at 5 seconds point without suppling video signal. Press the CUT OUT button to stop the insert mode at 10 secondes point. Put the unit into REV search mode, and rewind the tape to the 0 second point. (See Fig. 6-9-4.)

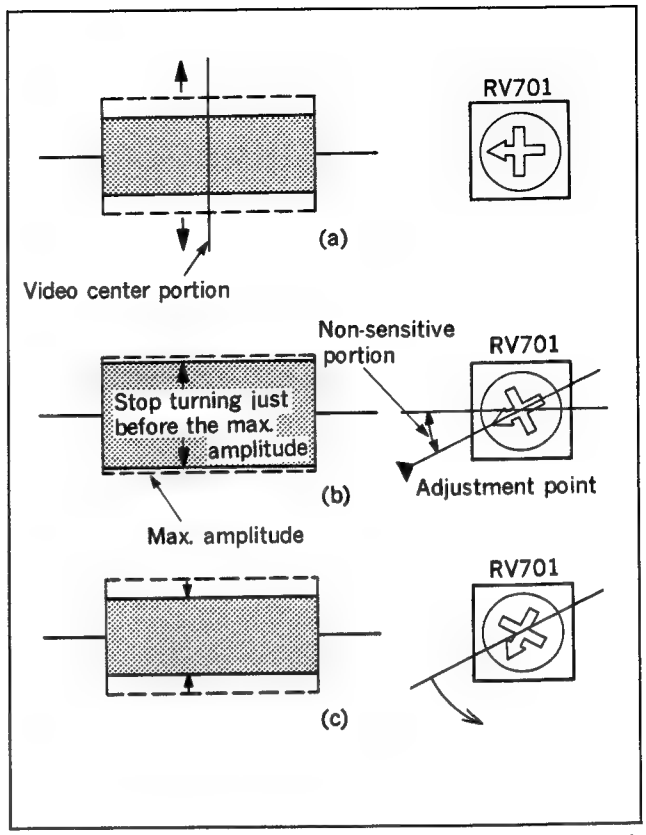


Fig. 6-9-3 RF wave form confirmation by RV701 adjustment

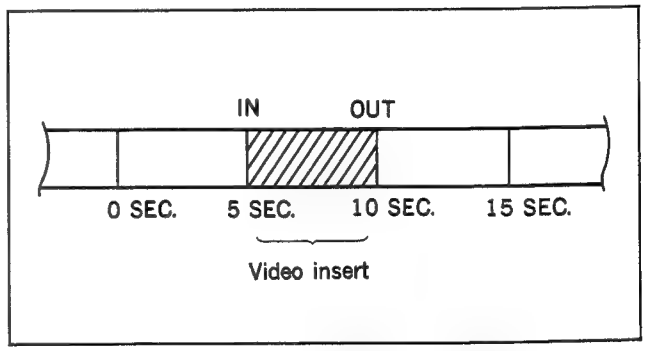


Fig. 6-9-4 Video insert for RV701 adjustment confirmation

13. Perform the step 12 operation 5 times. (Repeat the video insert operation at the same position of the tape.) (See Fig. 6-9-4.)

14. Rewind the tape to 0 second position, and press the VIDEO INSERT button (LED turns OFF), and press the PLAY button. (See Fig. 6-9-4.)

15. Confirm the CH1 wave form (PCM RF) of the oscilloscope. The RF level between 5 sec. thru. 10 sec. portion of the tape is more than 50% against the level between 0 sec. thru. 5 sec. portion of the tape. (See Fig. 6-9-5.)
    If not to meet the specification, perform the following adjustment again.

16. Thread a commercially available tape type E6-120 HME. Put the unit into REC mode about 15 seconds.

17. Perform step 11 thru. step 15, and confirm the specification of the PCM wave form at the video inserted portion is met (specification is the same as Fig. 6-9-5).
    If not to meet the specification, perform RV701 readjustment as the following steps.

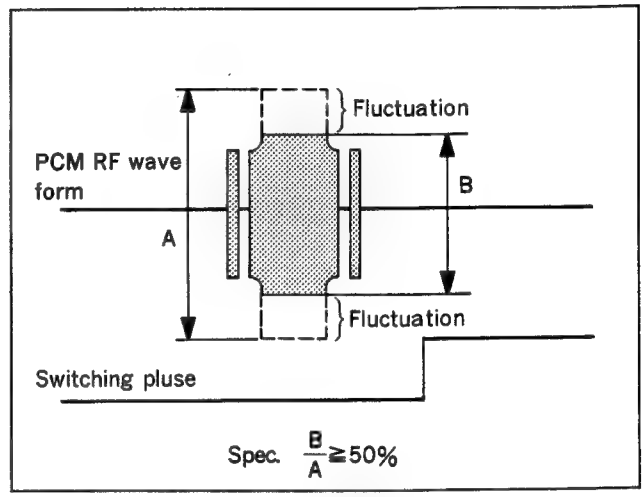


Fig. 6-9-5 Confirmation of PCM RF wave form

Readjustment procedures:

18. Readjustment of RV701 performs to meet the specifications for both MP and ME tapes, and the indicated position of RV701 is within the range of ±1 scale at the mechanical center of the potentiometer. (See Fig. 6-9-6.)
    If not to meet the position of the potentiometer, perform fine adjustment RV701 because of the adjustment condition of RV701 is shown in Fig. 6-9-7 (a) thru. (d).

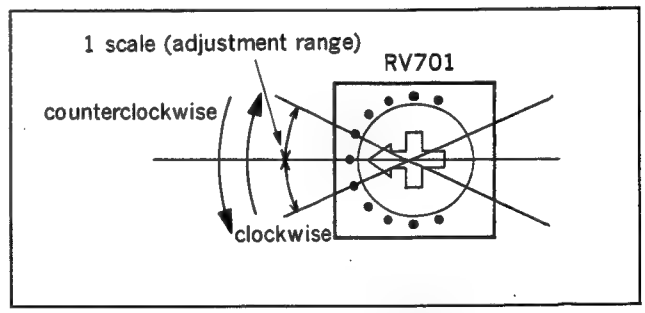


Fig. 6-9-6 Adjustment range of RV701

(If the specification for MP tape is not satisfied.)

18-1. Turn RV701 to 1/3 of the scale to clockwise direction. Perform step 10 thru. step 15, and confirm the specification is met (See Fig. 6-9-5).

18-2. If not to meet the specification, turn RV701 to 1/3 of the scale once more to clockwise direction (See Fig. 6-9-7 (a)).
Perform step 10 thru. step 15, and confirm the specification is met (see Fig. 6-9-5).

18-3. After the specification for MP tape is met, perform steps 16 and 17 using ME tape, and confirm the specifications is met (See Fig. 6-9-5).

(If the specification for ME tape is not satisfied.)

18-4. Turn RV701 to 1/3 of the scale to counterclockwise direction. Perform steps 16 and 17, and confirm the specification is met (See Fig. 6-9-5).

18-5. If not to meet the specification, turn RV701 to 1/3 of the scale once more to counterclockwise direction (See Fig. 6-9-7 (b).).
Perform steps 16 and 17, and confirm the specification is met (See Fig. 6-9-5).

18-6. After the specification for ME tape is met, perform step 10 thru. step 15 using MP tape, and confirm the specification is met (See Fig. 6-9-5).

(If the both specifications for ME and MP tapes are not satisfied.)

18-7. Confirm the difference of the PCM RF wave form fluctuation for both MP and ME tapes.
If the PCM RF wave form fluctuation for ME tape is least than for MP tape, adjustment position of RV701 is shown in Fig. 6-9-7 (c).
Then turn RV701 to 1/3 steps of the scale to clockwise direction several times so that the specification is met.
Confirm both specifications for ME and MP tapes are met (See Fig. 6-9-5).

18-8. If the PCM RF wave form fluctuation for MP tape is least than for ME tape, adjustment position of RV701 is shown in Fig. 6-9-7 (d).
Then turn RV701 to 1/3 steps of the scale to counterclockwise direction several times so that the specification is met.
Confirm both specifications for ME and MP tapes are met (See Fig. 6-9-5).

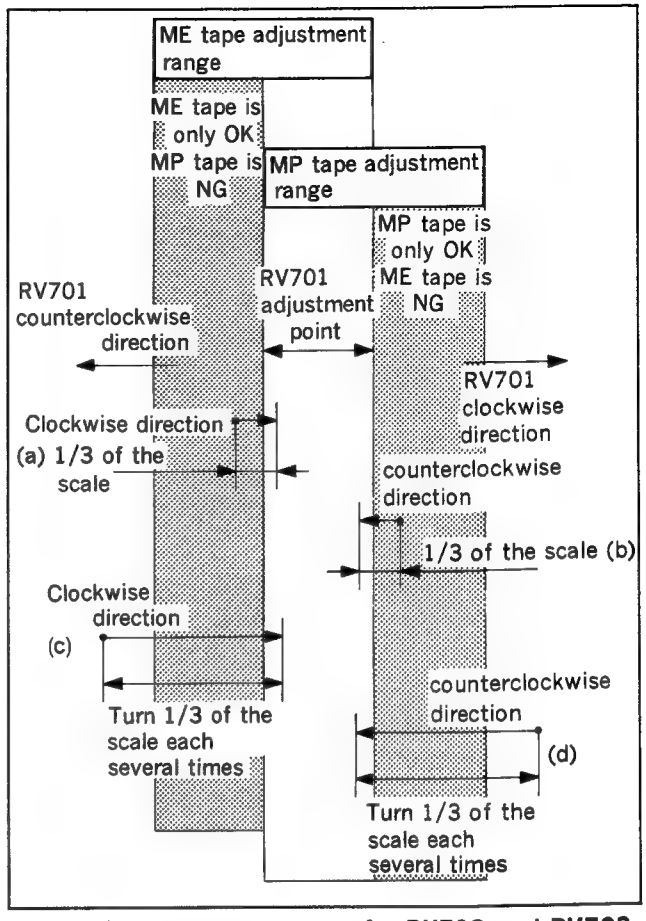


Fig. 6-9-7 Adjustment range for RV702 and RV703

REC Head Tracking Adjustment

For S/N 10341 and later

REC Head Tracking Adjustment is the most important adjustment for the precision of the video tracking under video insert mode. In the 8 mm video format, the tracking information is superimposed on the video track, then the tracking information is rerecorded using REC heads under the video insert mode.
When magnetic fringing phenomenon of the REC heads or delicate tracking error occures, tracking will be getting shift because of above reason by repeating the video insert operations. To minimize this tracking shift, more precise REC head tracking adjustment is essential. Give more attention to this adjustment.

1. Thread a commercially available tape type P6-120HMP. Put the unit into REC mode about one minute without suppling video signal, and rewind this portion of the tape.

2. Disconnect a connector CN502 on VRA-4 board, and connect 9-pin side of the REC head PB harness (J-6269-000-A) to this position. Connect the 6-pin connector on the other end of the harness to CN512 on PRE-10 board (refer to Fig. 6-9-8).

3. Set switch S401-1 on SST-2 board to ON. (Also switch S401-3 should be ON.)

4. Set the mode select switch to the EDIT side and press the ASSEMBLE button. [Lamp lights ON.]

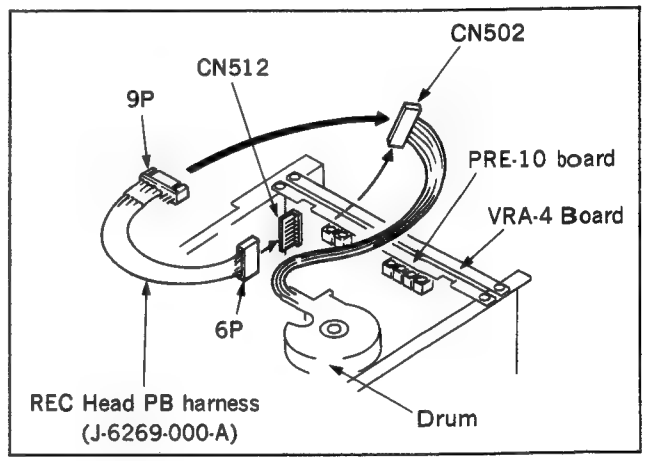


Fig. 6-9-8 Connection of REC head PB harness

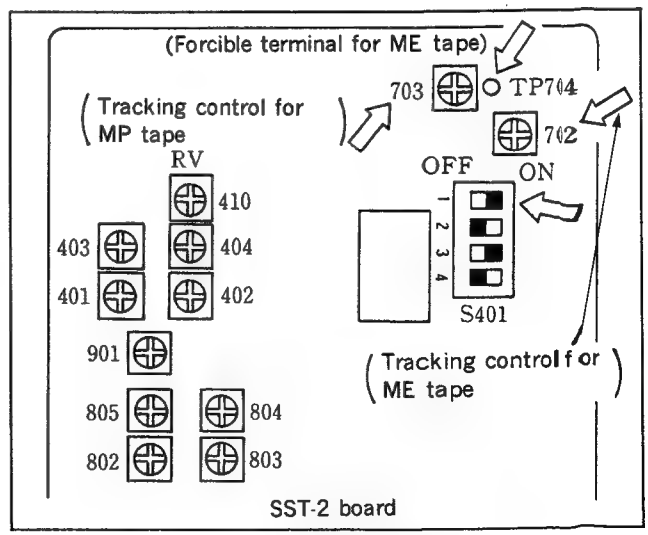


Fig. 6-9-9 REC head tracking adjustment

(REC head tracking adjustment for MP tape)

5. Play back the recorded portion at step-1 of the tape, maximize the RF wave shape (vdieo center portion) by using RV703 on SST-2 board. (See Fig. 6-9-10 (a).)

6. Turn RV703 to counterclockwise direction, and confirm the RF wave shape decreases. (See Fig. 6-9-10 (c).)

7. Turn again RV703 to clockwise direction, and stop the turning just before the maximum amplitude of the wave shape. (See Fig. 6-9-10 (b).)
   (**NOTE**: The RF wave shape changes with a little amount of delay because of AFT delay response, then turn slowly RV703.)

(REC head tracking adjustment for ME tape)

8. While holding the conditions from step 2 thru. step4, short between TP704 on SST-2 board and GND with a shorting clip lead (see Fig. 6-9-9).

9. Play back the recorded portion at step-1 of the tape, maximize the RF wave shape (video center portion) by using RV702 on SST-2 board. (See Fig. 6-9-9.)

10. Turn again RV702 to counterclockwise direction, and adjust the level of the wave shape to 96% of the maximum amplitude of the wave shape. (See Fig. 6-9-11.)
    (**NOTE**: The RF wave shape changes withh a little amount of delay because of AFT delay response, then turn slowly RV702.)

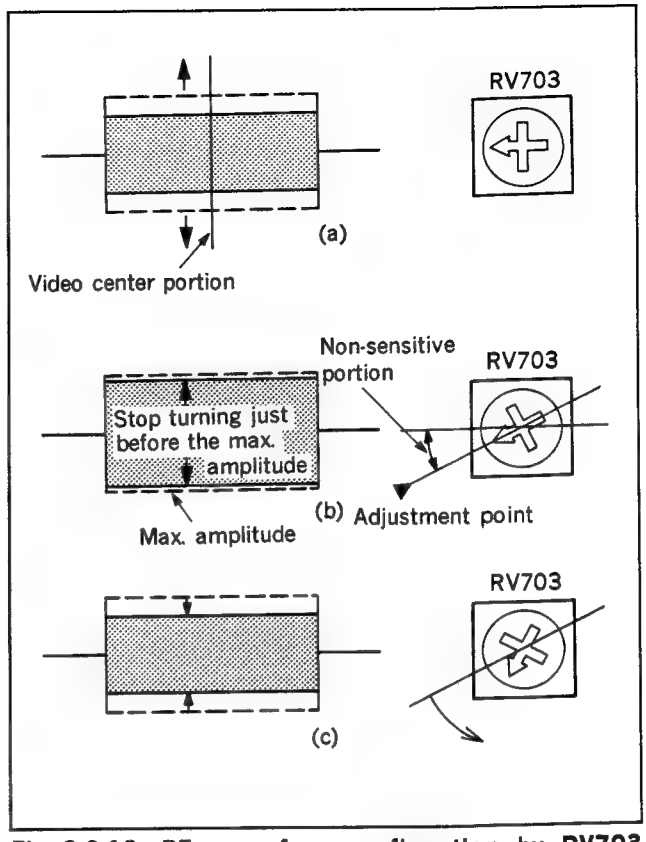


Fig. 6-9-10 RF wave form confirmation by RV703 adjustment

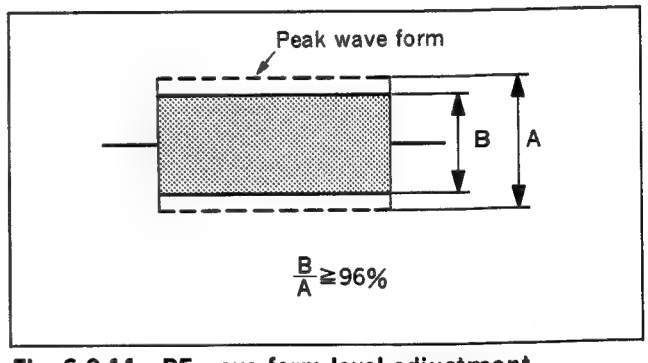


Fig. 6-9-11 RF wave form level adjustment

Confirmation of tracking adjustment

To confirm that RV702 and RV703 adjustments are performed correctly, perform the video insert repeatedly as the following procedures.

11. Disconnect the REC head PB harness, connect the REC harness of the drum to CN502 on VRA-4 board, and PB harness of the drum to CN512 on PRE-10 board. Disconnect the shorting clip lead from TP704 and GND. (See Fig. 6-9-8.)

12. Connect the oscilloscope as follows.
    CH1: TP4/PRE-10 board (PCM RF)
    CH3: TP7/PRE-10 board (TRIGGER)

13. Thread a commercially available tape type P6-120HMP. Put the unit into REC mode about 15 seconds. (See Fig. 6-9-12)

14. Put the unit into REV search mode, and Rewind the tape to the recording start point.
    Set the mode select switch to the EDIT side and press the VIDEO INSERT button (VIDEO LED lights ON). Set the time counter select switch to Time Code.

15. Press the PLAY button from the 0 second point, and press the PLAY and EDIT buttons simultaneously to enter the video insert mode at 5 seconds point without suppling video signal. Press the CUT OUT button to stop the insert mode at 10 secondes point. Put the unit into REV search mode, and rewind the tape to the 0 second point. (See Fig. 6-9-12.)

16. Perform the step 15 operation 5 times. (Repeat the video insert operation at the same position of the tape.) (See Fig. 6-9-12.)

17. Rewind the tape to 0 second position, and press the VIDEO INSERT button (LED turns OFF), and press the PLAY button.

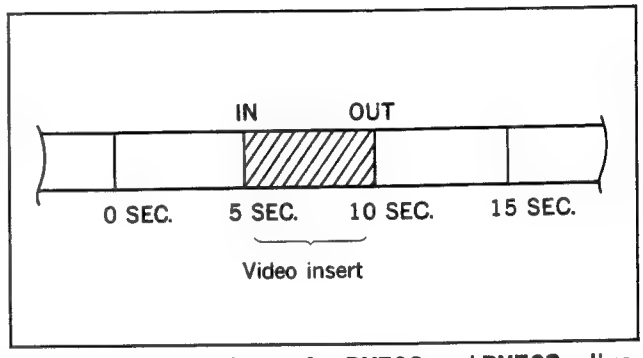


Fig. 6-9-12 Video insert for RV702 and RV703 adjustments confirmation

18. Confirm the CH1 wave form (PCM RF) of the oscilloscope. The RF level between 5 sec. thru. 10 sec. portion of the tape is more than 50% against the level beween 0 sec. thru. 5 sec. portion of the tape. (See Fig. 6-9-12.)
If not to meet the specification, perform the following adjustment again. (See Fig. 6-9-13.)

19. Thread a commercially available tape type E6-120HME. Put the unit into REC mode about 15 seconds.

20. Perform step 14 thru. step 18, and confirm the specification of the PCM wave form at the video inserted portion is met (specification is the same as Fig. 6-9-13).
If not to meet the specification, perform the readjustment as the following steps.

RV702 and RV703 readjustment procedures :
When the specification for MP tape is not satisfied, adjust using RV703, and the specification for ME tape is not satisfied, adjust using RV702.
(Never turn the potentiometer for which the specification is met.)
Adjustment procedures for RV702 and RV703 are the same.

21. Turn the potentiometer to 1/2 of the scale to clockwise direction against the adjustment position (A) where the specification was not met, and perform step 13 thru. step 18 for MP tape or steps 19 and 20 for ME tape. Confirm the specificationis met (see Fig. 6-9-14).

22. When the specification is not met by one time readjustment, compare the PCM RF wave shape level at the adjustment position (A) (See Fig. 6-9-14) with the PCM RF wave shape level of the video inserted portion that the first readjustment was done.
When the PCM RF wave shape for the first readjustment is larger than that for the adjustment position (A), turn the potentiometer once more to 1/2 of the scale to clockwise direction.
When the PCM RF wave shape for the first readjustment is smaller than that for the adjustment position (A), turn the potentiometer at the readjustment position (2) as shown in Fig. 6-9-14

23. Confirm the specification which is not met for MP or ME tape is met by performing this readjustment.

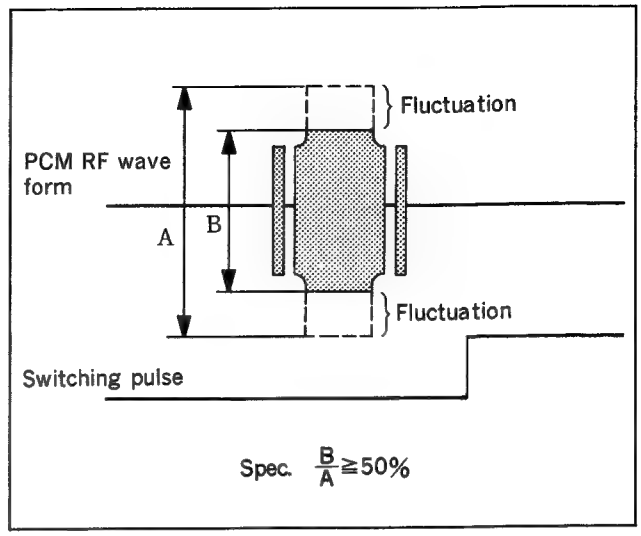


Fig. 6-9-13 Confirmation of PCM RF wave form

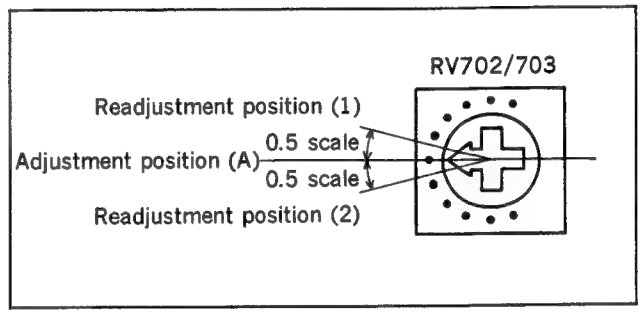


Fig. 6-9-14 Adjustment range for RV702 and RV703

6-10. Switching Position Adjustment

6-10-1. Switching Position Check (REC A)

1. Connect oscilloscope probe as follows.
   Oscilloscope Track Shift Tool
   CH1 → CH1 (CH A)
   CH3 → RF/SWP

2. Set the switches S401-1 and -3 on the SST-2 board to ON. (Fig. 6-10-1 (a). and Fig. 6-10-1 (b).).

3. Set the mode select switch of the control panel to the EDIT side, and press the assemble button.

4. Use the REC head PB harness in the same condition as section 6-9, item 1.

5. Thread the alignment tape (WR2-3NS), and press [PLAY] .

6. Check the error T1 of the wave shape indicated in the figure to satisfy specifications 1. (See Fig. 6-10-2)

For S/N 10001 thru. 10340

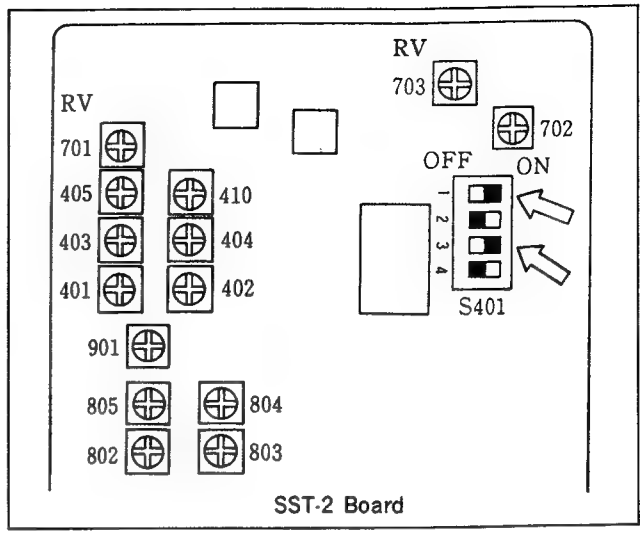


Fig. 6-10-1 (a) Switching position check (REC A) ①

For S/N 10341 and later

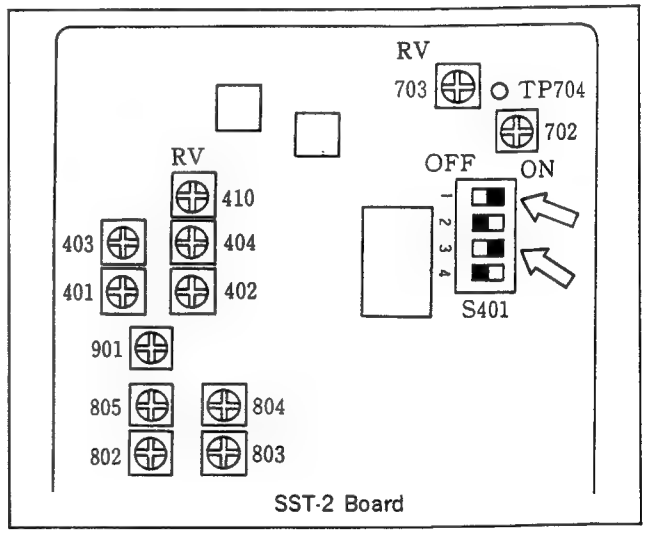


Fig. 6-10-1 (b) Switching position check (REC A) ①

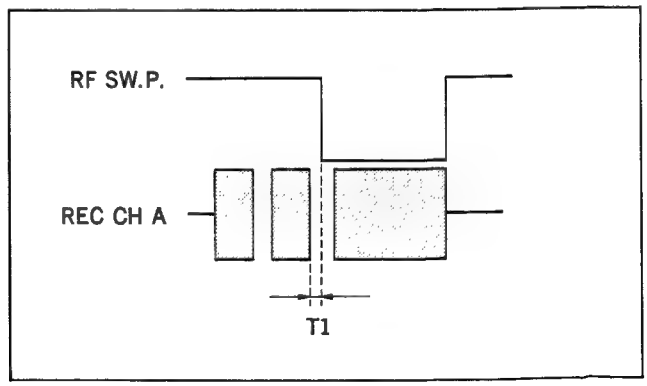


Fig. 6-10-2 Switching position check (REC A) ②

Specifications 1: Error T1 of wave shape
T1=0±10 μs

6-10-2. Switching Position Adjustment (REC A)

1. If specifications 1 is not satisfied in the check of section 6-10-1, perform the adjustment following. (See Fig. 6-10-2.)

2. Adjust the error T1 to satisfy specifications 1 by turnning the RV402 on the SST-2 board. (See Fig. 6-10-3 (a) , Fig. 6-10-3(b) , and Fig. 6-10-3(c).)

3. After the adjustment is completed, check it referring to section 6-10-1.

For S/N 10001 thru. 10340

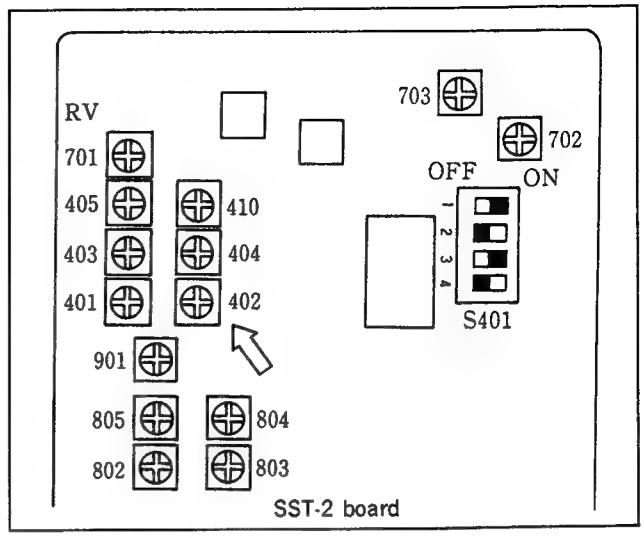


Fig. 6-10-3 (a) Switching position adjustment

For S/N 10341 and later

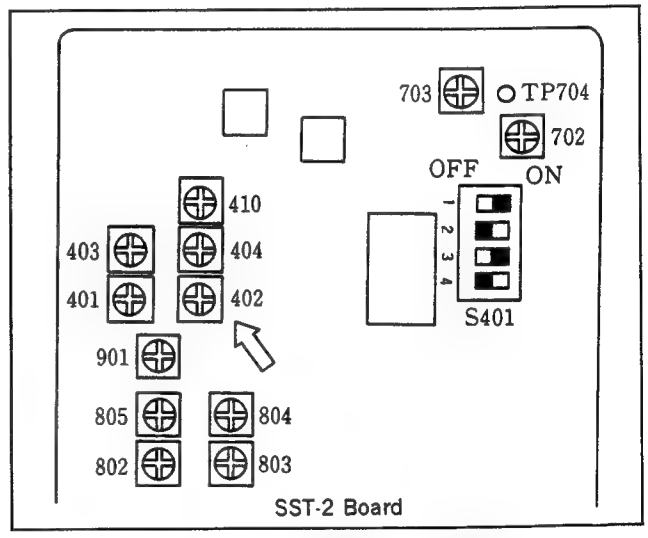


Fig. 6-10-3 (b) Switching position adjustment

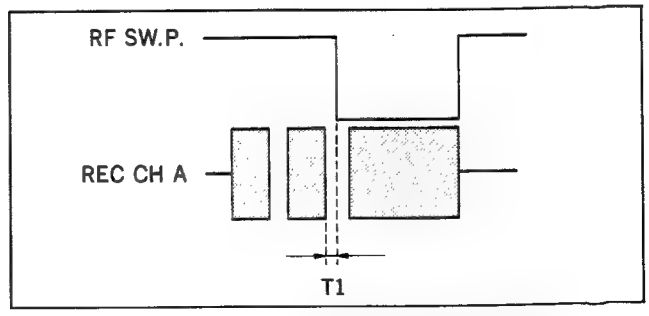


Fig. 6-10-3(c) Switching position check (REC A)

Specifications 1: Error T1 of wave shape
T1=0±10 μs

6-10-3. Switching Position Check (REC B)

1. Connect an oscilloscope probe as follows.
   Oscilloscope Track Shift Tool
   CH2 → CH2 (CH B)
   CH3 → RF/SWP

2. Set the switch S401-1 on SST-2 board to ON. (See Fig. 6-10-4 (a) and Fig. 6-10-4 (b).)

3. Set the mode select switch of the control panel to the EDIT, and press the ASSEMBLE button.

4. Use the REC head PB harness in the same manner as section 6-9, item 1.

5. Thread the alignment tape (WR2-3NS), and press [PLAY] .

6. Check the error T1 of the wave shape indicated in the figure to satisfy specifications 2 (Fig. 6-10-5).

For S/N 10001 thru. 10340

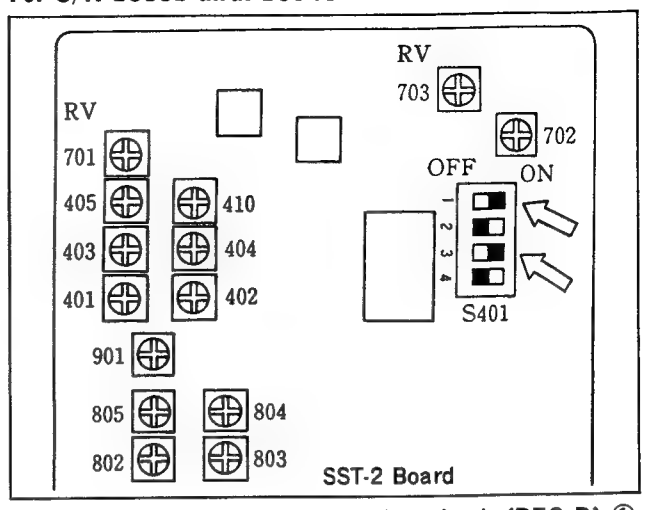


Fig. 6-10-4 (a) Switching position check (REC B) ①

For S/N 10341 and later

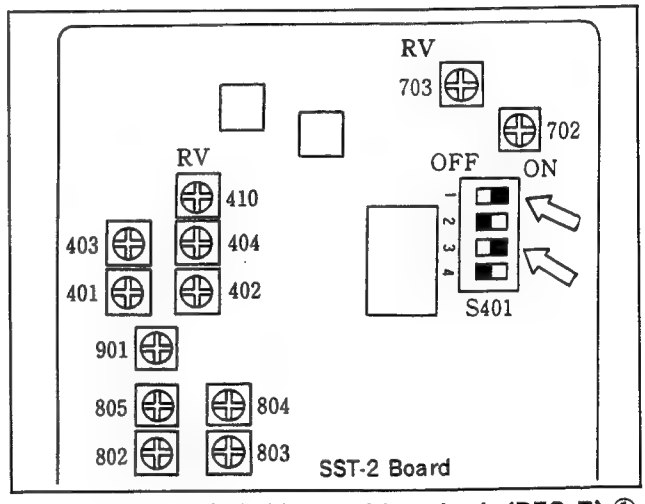


Fig. 6-10-4 (b) Switching position check (REC B) ①

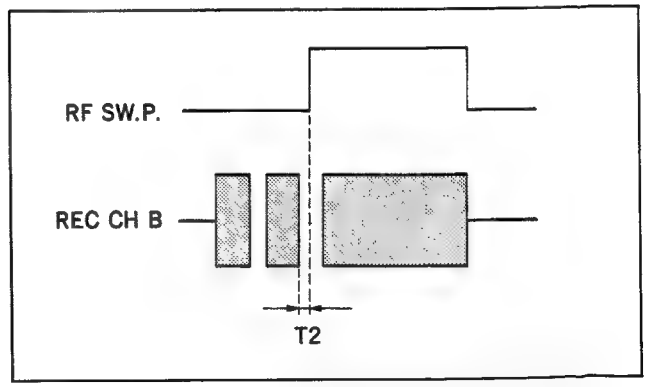


Fig. 6-10-5 Switching position check (REC B) ②

Specifications 2: Error T2 of wave shape
$T2=0\pm10\mu s$

6-10-4. Switching Position Adjustment (REC B)

1. If specifications 2 is not satisfied in the check of section 6-10-3, perform the following adjustment. (See Fig. 6-10-5.)

2. Adjust the error T2 to satisfy specifications 1 by turnning the RV401 on the SST-2 board (Fig. 6-10-6).

3. After the adjustment is completed, check it referring to section 6-10-3.
(See Fig. 6-10-6 (a), Fig. 6-10-6 (b), and Fig. 6-10-6(c).)

For S/N 10001 thru. 10340

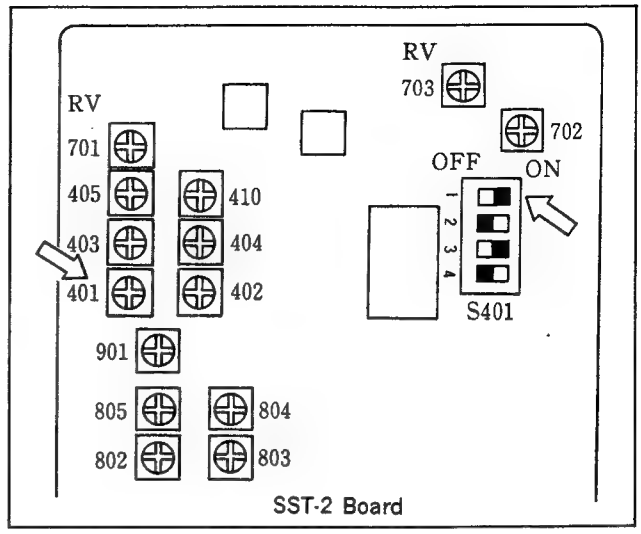


Fig. 6-10-6 (a) Switching position adjustment (REC B)

For S/N 10341 and later

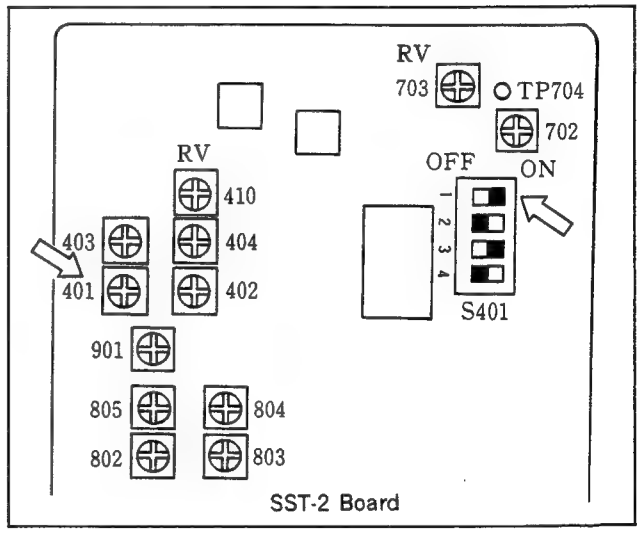


Fig. 6-10-6 (b) Switching position adjustment (REC B)

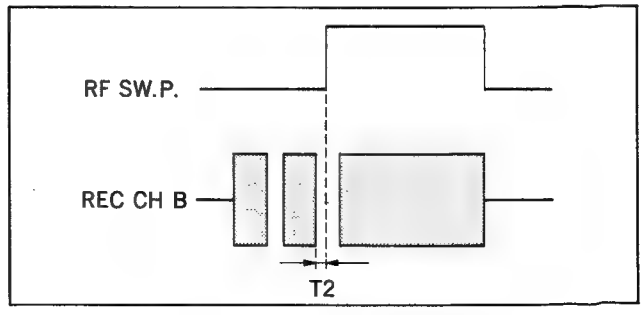


Fig. 6-10-6(c) Switching position check (REC B)

Specifications 2: Error T2 of wave shape
$T2=0\pm10\ \mu s$

6-10-5. Switching Pulse Phase Check

1. Thread the alignment tape (WR2-3NS), and press [PLAY] .
2. Switch the TRIG SLOPE SW +/− of an oscilloscope, and check that the difference of the phase satisfies specifications 3.
3. If specifications 3 is not satisfied, finely adjust it referring to section 6-10-1 to 6-10-4 "Switching position adjustment".
4. Confirm all the items sections from 6-10-1 to 6-10-4 and all the phase checks are satisfied.
5. Release the setting in the section 6-9 REC head tracking adjustment, and set to the original states.
6. Turn OFF the assemble button, and set the S401 switch No.1 on the SST-2 board to ON.

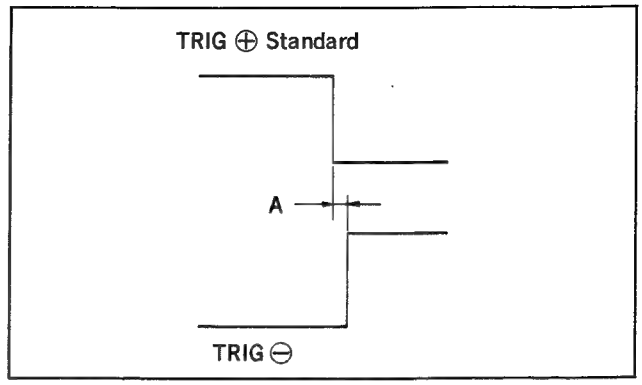


Fig. 6-10-7 Switching pulse phase check

Specifications 3: Phase difference A
A=within 0±5 μs

6-10-6. Switching Position Check (PB A)

1. Check only the switch S401-3 is on the SST-2 board is ON.
2. Connect the probe of an oscilloscope as follows.
   Oscilloscope Track Shift Tool
   CH1 →CH1 (CH A)
   CH3 →RF/SWP
3. Thread the alignment tape (WR2-3NS), and press [PLAY] .
4. Check the error T3 indicated in the figure satisfies specifications 4 by turnning RV403 on SST-2 board.

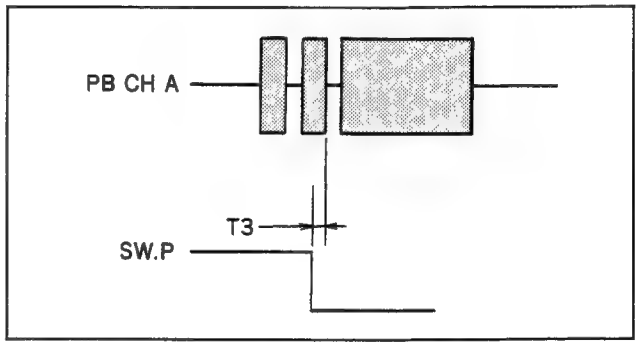


Fig. 6-10-8 Switching position check (PB A)

Specifications 4: error T3 of wave shape
T3=within 0±10 μs

6-10-7. Switching Position Adjustment (PB A)

1. If specifications 4 is not satisfied in the check in 6-10-6, perform the following adjustment. (See Fig. 6-10-8.)

2. Adjust it so that the error T3 of the wave shape satisfies specifications 4 by turnning RV403 on the SST-2 board. (See Fig. 6-10-9 (a) and Fig. 6-10-9 (b).)

3. After the adjustment is completed, reconfirm it referring to section 6-10-6 again.

For S/N 10001 thru. 10340

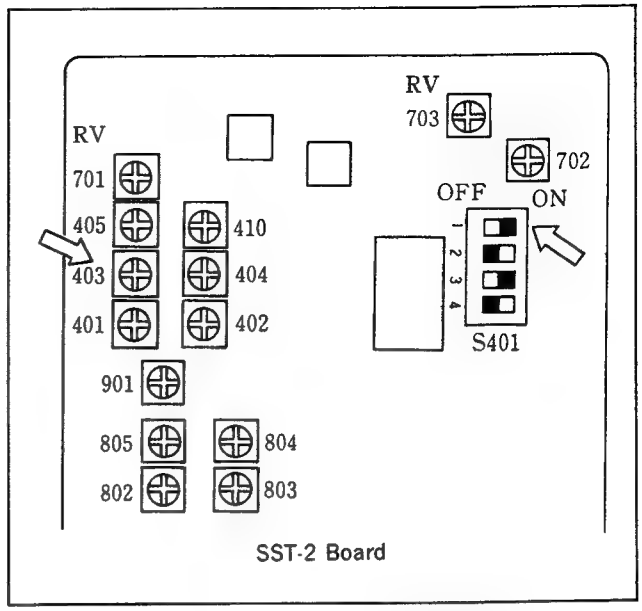


Fig. 6-10-9 (a) Switching position adjustment (PB A)

For S/N 10341 and later

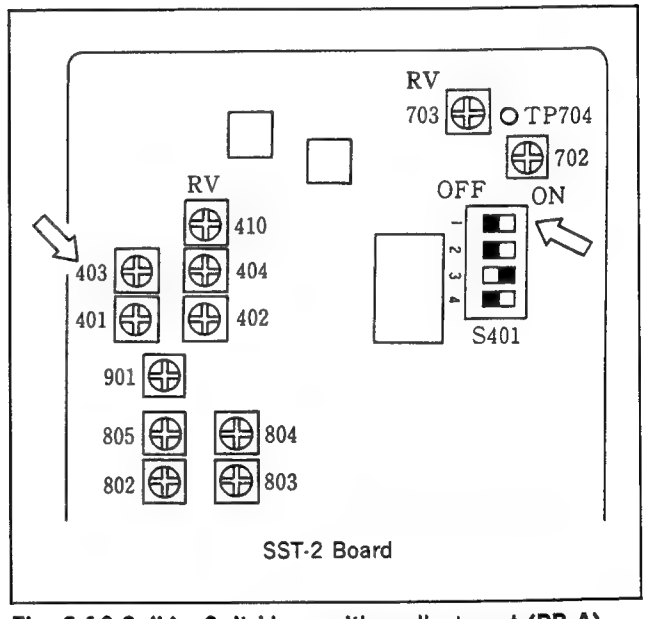


Fig. 6-10-9 (b) Switching position adjustment (PB A)

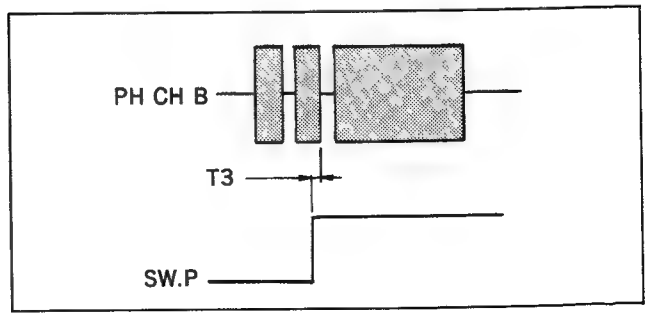


Fig. 6-10-9 (c) Switching position check (PB A)

Specifications 4: Error T3 of wave shape
T3=within 0±10 μs

6-10-8. Switching Position Check (PB B)

1. Set the harness in the same manner as section 6-10-6.

2. All the S401 switches on the SST-2 board are OFF.

3. Connect an oscilloscope as follows.
   Oscilloscope Track Shift Tool
   CH2 →CH2 (CH B)
   CH3 →RF/SWP

4. Thread the alignment tape (WR2-3NS), and press [PLAY]

5. Check error T4 of the wave shape illustrated in the figure satisfies specifications 5.

6. Press [EJECT] , and eject the tape.

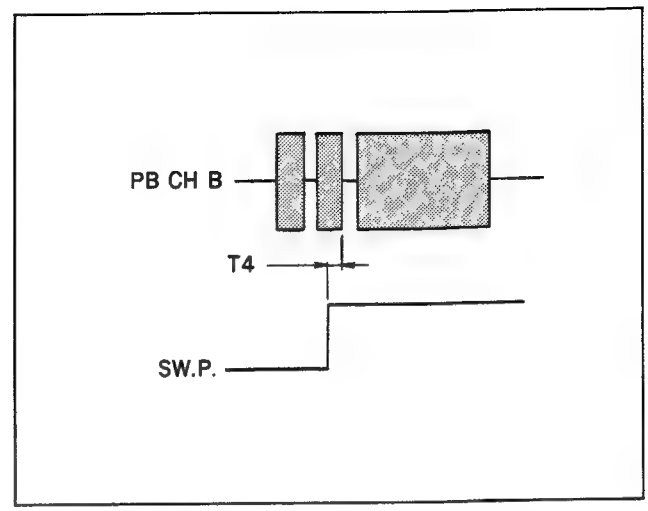


Fig. 6-10-10 Switching position check (PB B)

Specifications 5: Error T4 of the wave shape
T4=0±10 μs

6-11. Self Record and Playback RF Envelope Check (Video)

Check procedure

1. Connect the probe CH1 of an oscilloscope to TP3 of the PRE board.

2. Install the cassette tape (E6-120HME), and record on it with no signal input.

3. Press [STOP] to stop. Rewind the recorded portion, and press the [PLAY] button.
   Check the RF envelope (Fig. 6-11-1) and fluctuation (Fig. 6-11-2).
4. Check that envelope and fluctuation of the RF output wave shape satisfies the specifications 1. and 2. on both CH A and CH B.

Specifications 1. Envelope of the wave shape

$$\frac{B}{A} \geqq 0.8$$

$$\frac{C}{D} \geqq 0.9$$

$$\frac{E}{A} \geqq 0.9$$

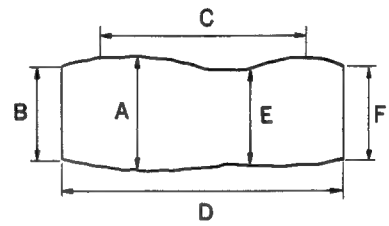
$$\frac{F}{A} \geqq 0.65$$

Specifications 2. Fluctuation

Within 10% (center)

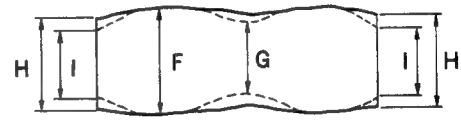
$$\frac{G}{F} \geqq 0.9$$

$$\frac{I}{H} \geqq 0.9$$



A: RF maximum output level
B, F: RF minimum output level
C: Range more than 80% of A
D: One field
E: RF minimum output level at range C

Fig. 6-11-1 Form of RF output wave shape



F: Maximum output level of the maximum fluctuation area
G: Minimum output level of the maximum fluctuation area
H: Maximum output level of the entrance/exit fluctuation area
I: Maximum output level of the entrance/exit fluctuation area

Fig. 6-11-2 RF fluctuation wave shape

6-11-1. Self Recording and Playback RF Envelope Check (PCM A/B)

1. Connect the probe of an oscilloscope to the PRE-10 board as follows.
   Oscilloscope PRE-10 board
   CH1 → TP-4
   CH3 → TP-7

2. Rewind the recorded portion in "Self Recording RF envelope Check (Video)".

3. Press [PLAY] to observe the wave shape.

4. Observe the wave shape, confirm that the specifications is satisfied.

   Specifications: B/A≧85%

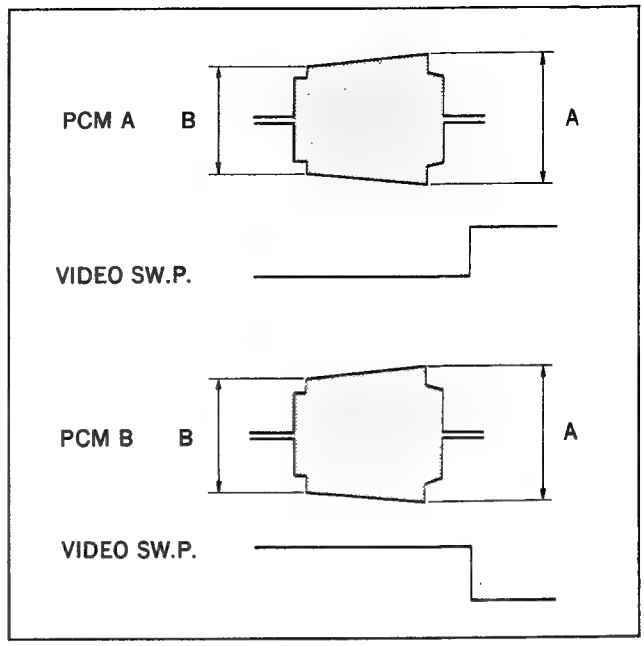


Fig. 6-11-3 Self recording RF envelope check (PCM A/B)

6-11-2. Entrance Side Overlap Check

Play the recorded portion in "Self Recording RF envelope Check (Video)".
Check that RF wave shape appears. (Fig. 6-11-4)

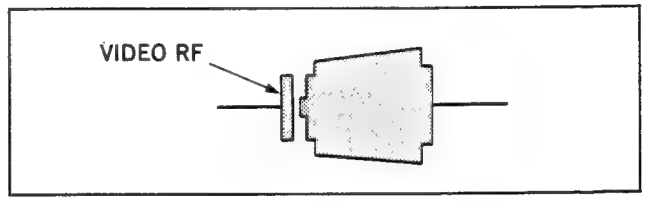


Fig. 6-11-4 Video RF wave shape

6-11-3. Exit Side Overlap Check (Fig. 6-11-4)

1. Connect the probe of an oscilloscope and the track shift tool as follows.
   Oscilloscope Track shift tool
   CH1 → CH1 (CH A)
   CH2 → CH2 (CH B)
   CH3 → RF/SW P
   (trigger)

2. Thread the alignment tape (WR2-3NS), and press [PLAY] .

3. Check the overlap amount T1 of the wave shape on the exit side of CH A satisfies the specifications.
   Specifications: Overlap amount
   T1=100 μs or more

4. Similarly, check the overlap amount T2 of the wave shape on the exit side of CH B satisfies the specifications.
   Specifications: Overlap amount
   T2=100 μs or more

5. Press [EJECT] , and eject the tape.

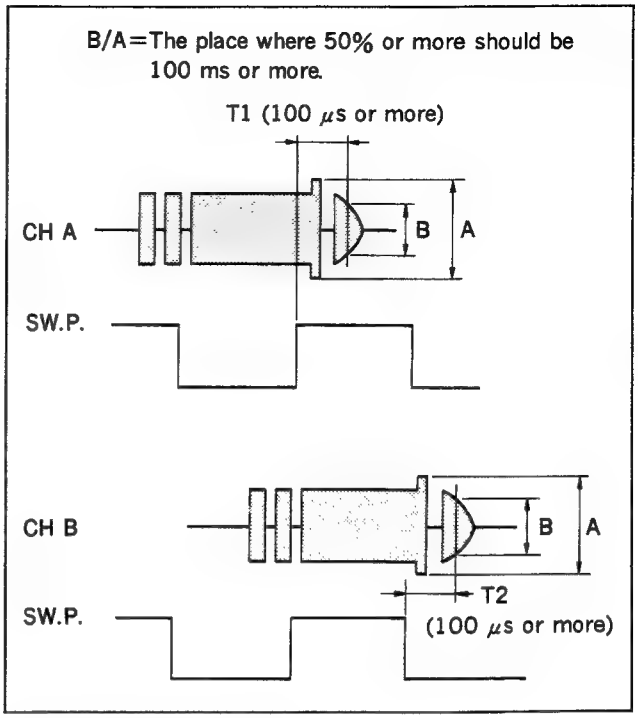


Fig. 6-11-5 Exit overlap

SECTION 7
POWER SUPPLY CONFIRMATION

[Equipment Required]

- Digital voltmeter : ADVANTEST TR6845 or equivalent

7-1. CONFIRMATION OF REG (POWER SUPPLY) OUTPUT

Machine condition for adjustment	Specifications	Adjustments
• E-E mode	CN264-4/DC-57 8.2 ± 0.3 Vdc	(confirmation)

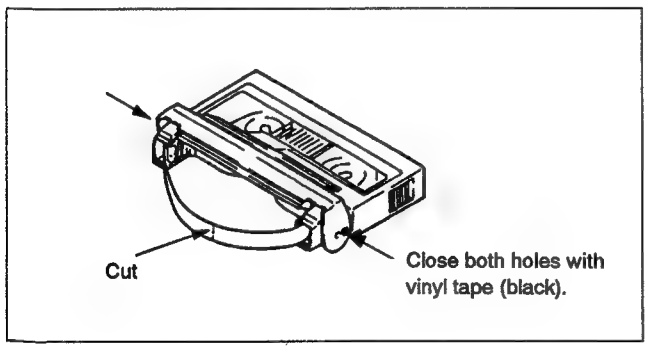
SECTION 8
SERVO SYSTEM ALIGNMENT

[Equipment Required]

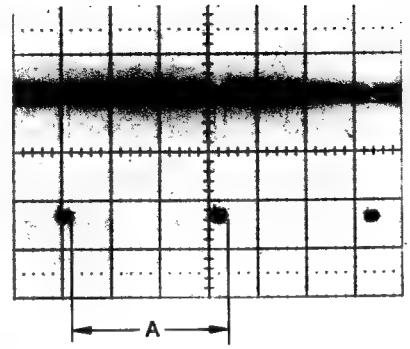
- Oscilloscope : TEKTRONIX 2445 or equivalent
- Frequency counter : ADVANTEST TR5821AK or equivalent
- Digital voltmeter : ADVANTEST TR6845 or equivalent
- Test signal generator : TEKTRONIX 1410 or equivalent
- Alignment tape : Refer following table

Name (Part No.)	Rec mode	Tape Type	Tape Speed	Contents	
				Video Area	PCM Area
SP operation check WR5-8NSE (8-967-995-43)	Hi 8	ME	SP	VIDEO SIGNAL Color-bar 4 min. Monoscope 4 min. AUDIO SIGNAL (AFM) 400 Hz 60% mod. **Note:** This tape is recorded the above signals repeatedly.	AUDIO SIGNAL (PCM) 400 Hz 20 min.
LP operation check WR5-8NLE (8-967-995-52)	Hi 8	ME	LP	VIDEO SIGNAL Color-bar 4 min. Monoscope 4 min. AUDIO SIGNAL (AFM) 400 Hz 60% mod. **Note:** This tape is recorded the above signals repeatedly.	AUDIO SIGNAL (PCM) 400 Hz 40 min.

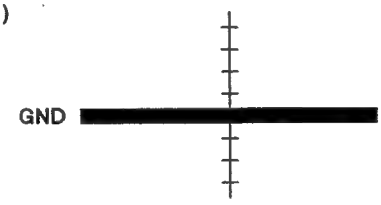
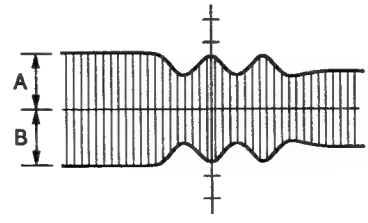
- Empty cassette (See below.)
  1. Draw out a tape and cut it.
  2. Cover two holes on both side of the cassette with vinyl tape (black).



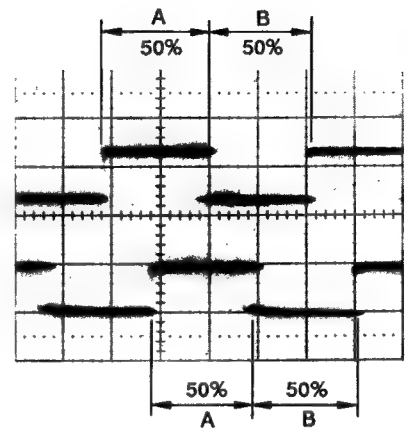
8-1. CHARACTER DISPLAY RANGE ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 2 V/div 20 μs/div TRIG: CH1	TP30/SST-2 (P-2) (CH1)  A = 58 ± 1 μs	⊘ RV2/SST-2 (N-3)

8-2. CAPSTAN FG BALANCE ADJUSTMENT (Serial No. 10,071 and higher)

Machine condition for adjustment	Specifications	Adjustments
Step 1 • Short TP501/SST-2 (J-3) to GND. • OSCILLOSCOPE CH1 : 0.5 V/div 5 ms/div DC mode TRIG: CH1	Use the oscilloscope. TP1/CN-551 (CH1)  CH1 : Set to GND level.	
Step 2 • VIDEO IN: color-bar signal • Insert the EMPTY cassette and put into the REC mode. (Refer to page 8-1.) • OSCILLOSCOPE CH1 : 0.5 V/div 5 ms/div AC mode TRIG: CH1 After adjusted, disconnect the short wire.	TP1/CN-551 (CH1)  A = B	⊘ RV1/CN-551

8-3. CAPSTAN FG ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Playback the alignment tape WR5-8NSE. (Any signals are available.) • OSCILLOSCOPE CH1 : 2 V/div 0.2 ms/div CH2 : 2 V/div 0.2 ms/div TRIG: CH1	CH1 : TP601/SST-2 (F-1) CH2 : TP602/SST-2 (F-1)  When the TP601 signal is rising, TP602 is at the low level.	CH1 : RV601/SST-2 (F-1) CH2 : RV602/SST-2 (F-1)

8-4. CAPSTAN FREE SPEED ADJUSTMENT

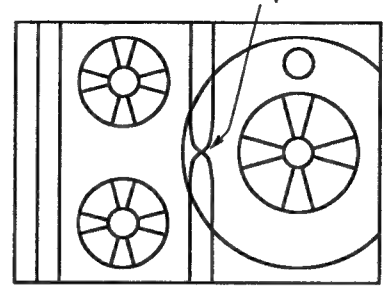
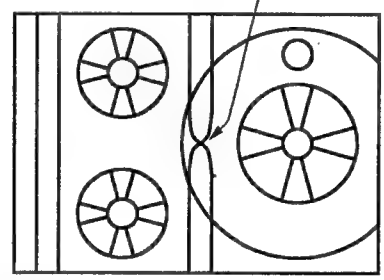
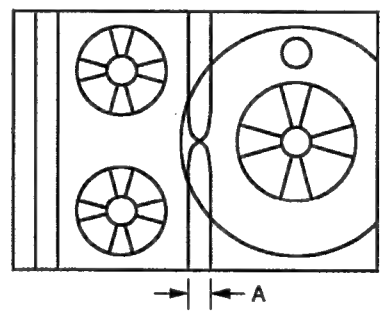
Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • S401 bit-3/SST-2 (C-2) : ON • Short TP501/SST-2 (J-3) to GND • Insert the EMPTY cassette and put into the REC mode. (Refer to page 8-1.) After adjusted, S401 bit-3/SST-2 (C-2) set to OFF, and disconnect the short wire.	Use the frequency counter. TP601/SST-2 (F-1) 960 ± 2 Hz	RV410/SST-2 (C-6)

8-5. REEL FG ADJUSTMENT

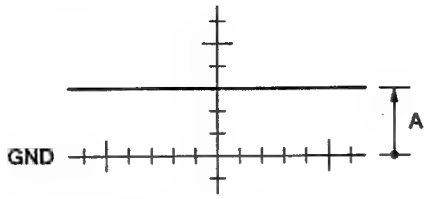
Machine condition for adjustment	Specifications	Adjustments
• Playback the alignment tape WR5-8NSE. (Any signals are available.)	Use the frequency counter. TP901/SST-2 (E-6) 21 ± 1 Hz	⊘ RV901/SST-2 (B-6)
• Check while playback the alignment tape WR5-8NSE. (Any signals are available.) • OSCILLOSCOPE CH1 : 0.5 V/div DC mode	Use the oscilloscope. TP902/SST-2 (E-5) (CH1) 1.0 – 1.4 Vdc	
• Check while playback the alignment tape WR5-8NSE with CUE (×9). (Any signals are available.)	Use the frequency counter. TP901/SST-2 (E-6) 37 – 50 Hz	
• OSCILLOSCOPE CH1 : 0.5 V/div DC mode	Use the oscilloscope. TP902/SST-2 (E-5) (CH1) 1.4 – 1.9 Vdc	

8-6. PICTURE SPLITTING ADJUSTMENT (Serial No. 10,071 and higher)

Note : Remove the TBC board so that the video signal may be output without the TBC board.

Machine condition for adjustment	Specifications	Adjustments
Step 1 • Connect the monitor TV to VIDEO OUT connector. • Playback the monoscope signal of alignment tape WR5-8NSE. • Turn RV802/SST-2 (F-2) fully counterclockwise.	Monitor Cross point  Check the cross point position of the vertical line. After check, RV802/SST-2 (F-6) fully turn clockwise.	
Step 2	Monitor Cross point  Set the cross point of the vertical line to the position checked in the Step 1.	● RV803/SST-2 (F-5)
After adjusted, connect the TBC board.	Monitor  Minimize A Set S2/SST-2 (F-5) to NOR, and minimize A. Confirm the picture splitting A. Set S2/SST-2 (F-5) to INV, and minimize A. Confirm the picture splitting A. Set S2 to the most minimum picture splitting mode, NOR or INV. Adjust RV802 so that the picture splitting to make minimum.	● RV802/SST-2 (F-6)

8-7. RF DET LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 0.5 V/div DC mode	TP604/SST-2 (G-5) (CH1)  A = 0.30 ± 0.02 Vdc	⊘ RV603/SST-2 (G-5)

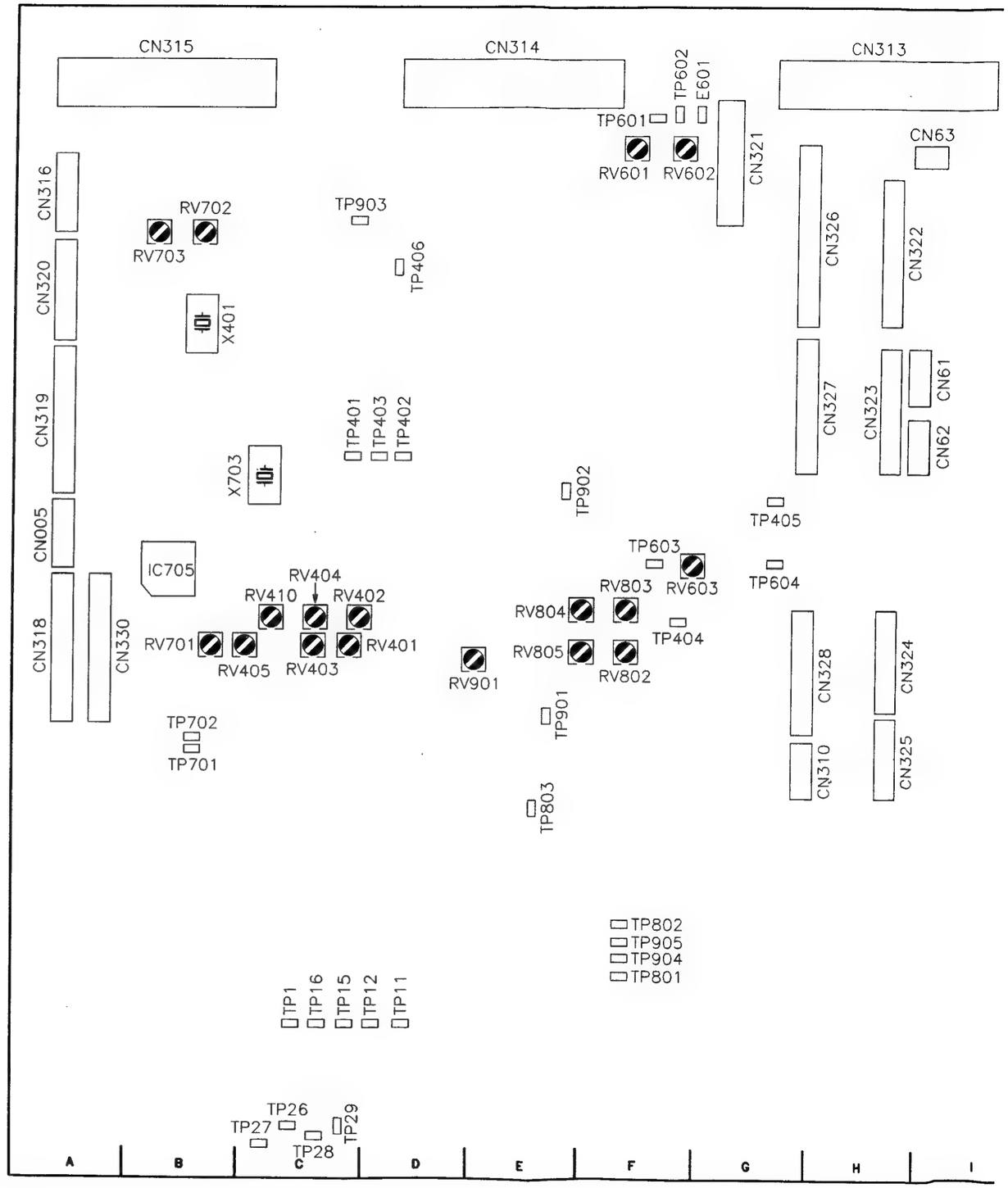
8-8. AFM RF ENVELOPE DET ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 0.5 V/div DC mode	CN604-28A/AU-156 (J-4) (CH1) Set to GND level.	⊘ RV1001/AU-156 (M-1)

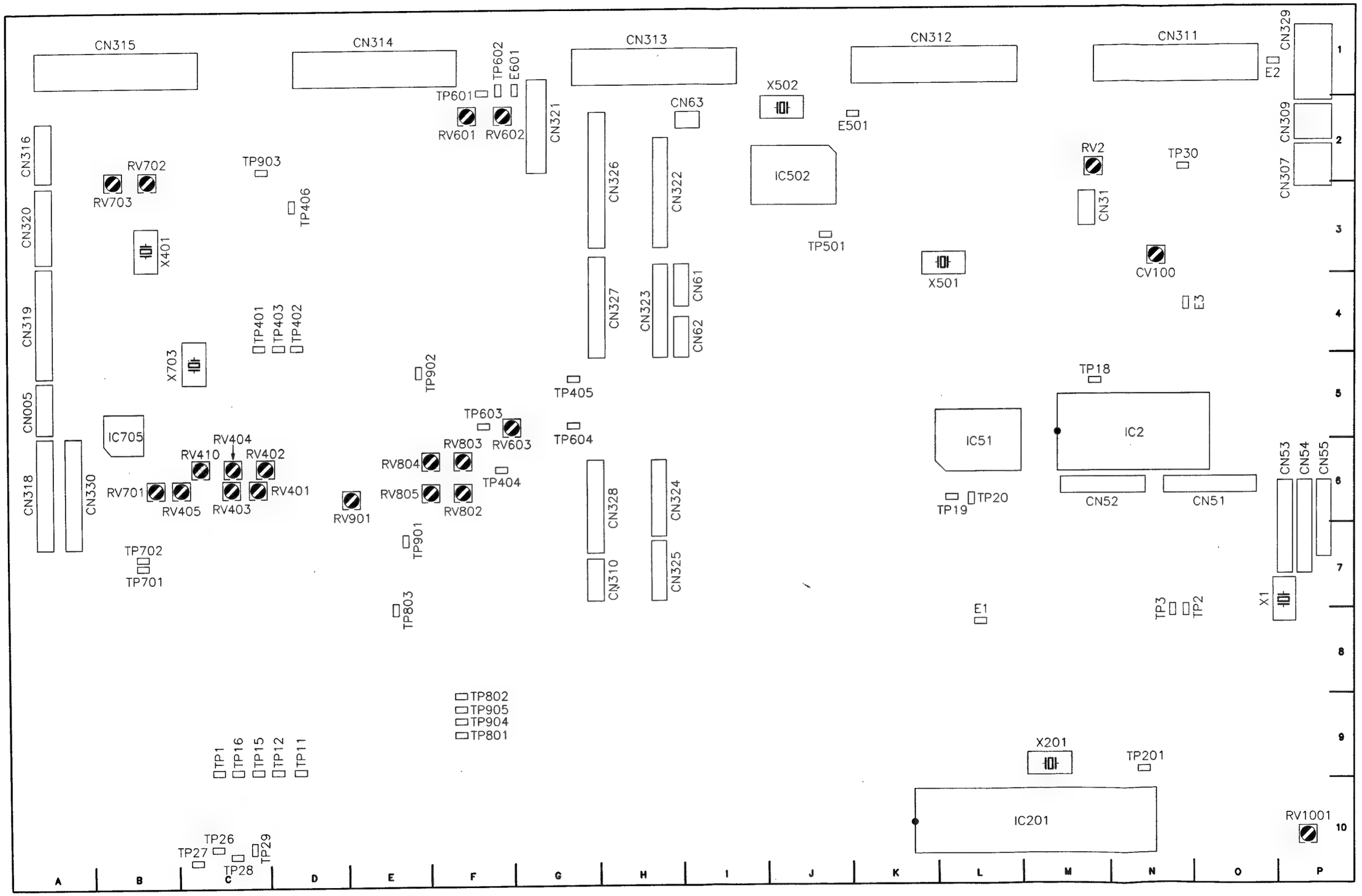
SST-2 BOARD

Ref. No.	Page
CV100	10-33
RV2	8-2
RV410	8-3
RV601	8-3
RV602	8-3
RV603	8-6
RV802	8-5
RV803	8-5
RV901	8-4

Locations of RVs on SST-2 Board.



Locations of RVs on SST-2 Board.

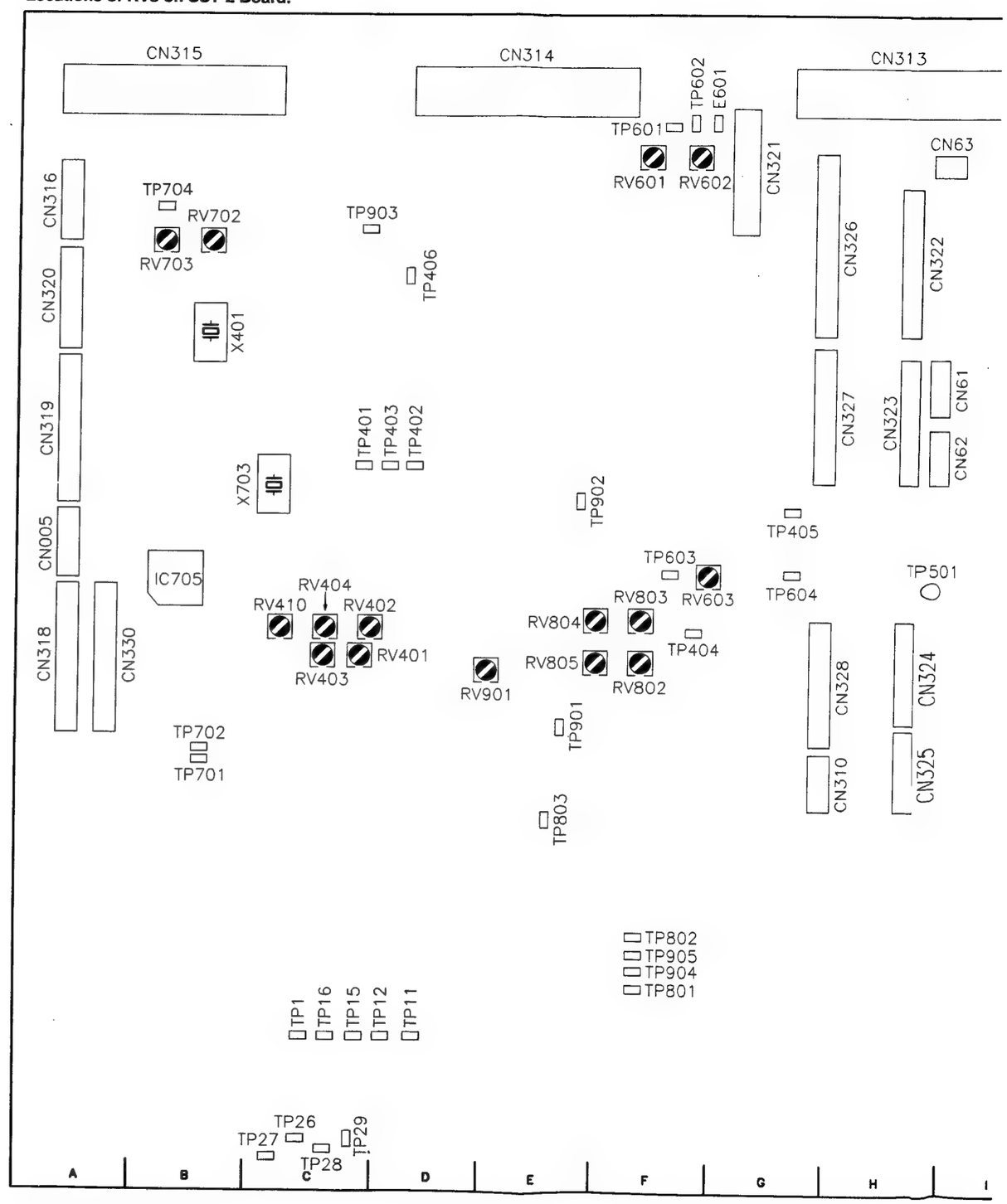


SST-2 BOARD

Ref. No.	Page
CV100	10-33
RV2	8-2
RV410	8-3
RV601	8-3
RV602	8-3
RV603	8-6
RV802	8-5
RV803	8-5
RV901	8-4

S/N (UC) : 10341 and higher

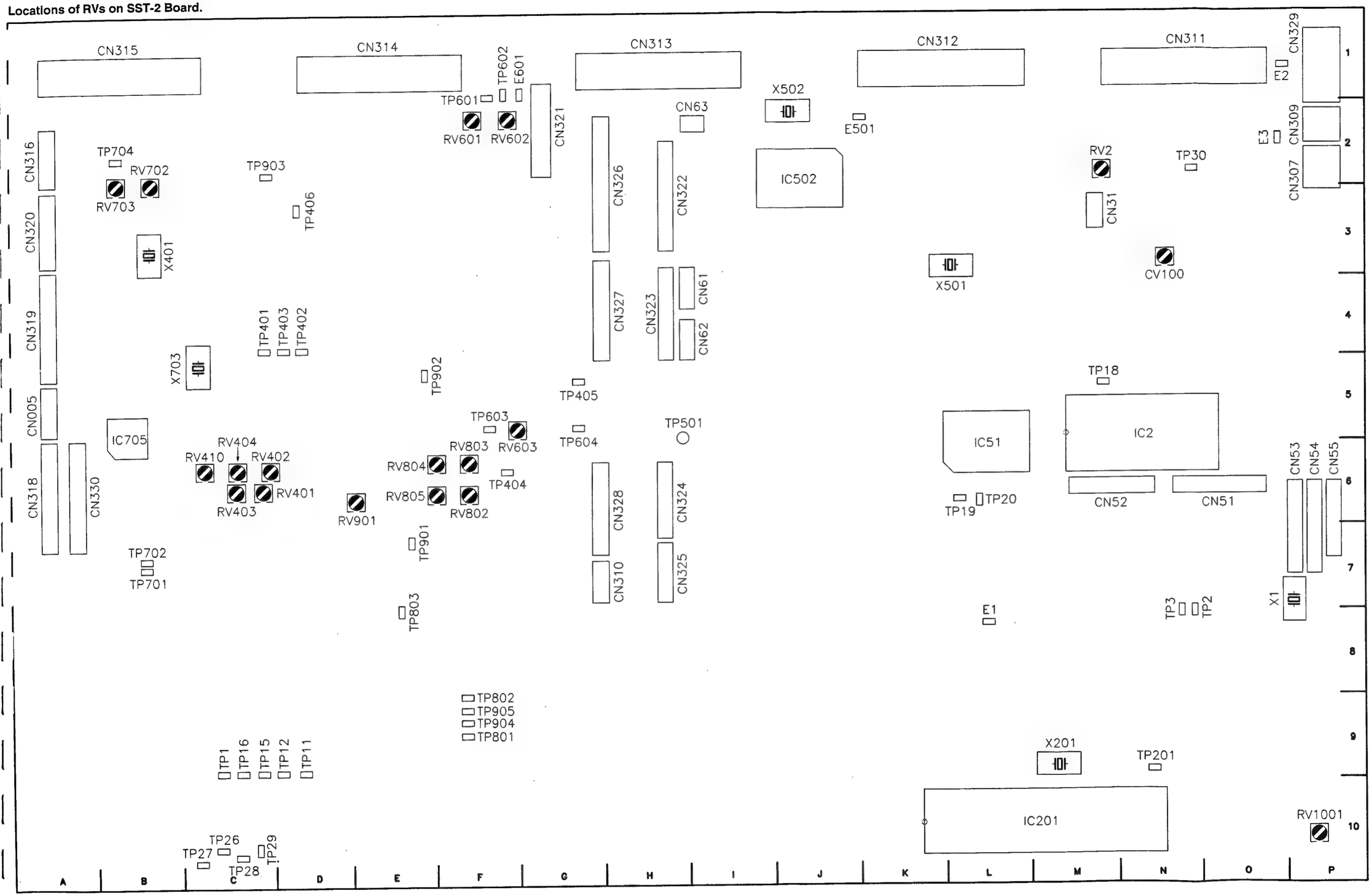
Locations of RVs on SST-2 Board.



8-7 (b)

S/N (UC) : 10341 and higher

Locations of RVs on SST-2 Board.



8-7 (b)

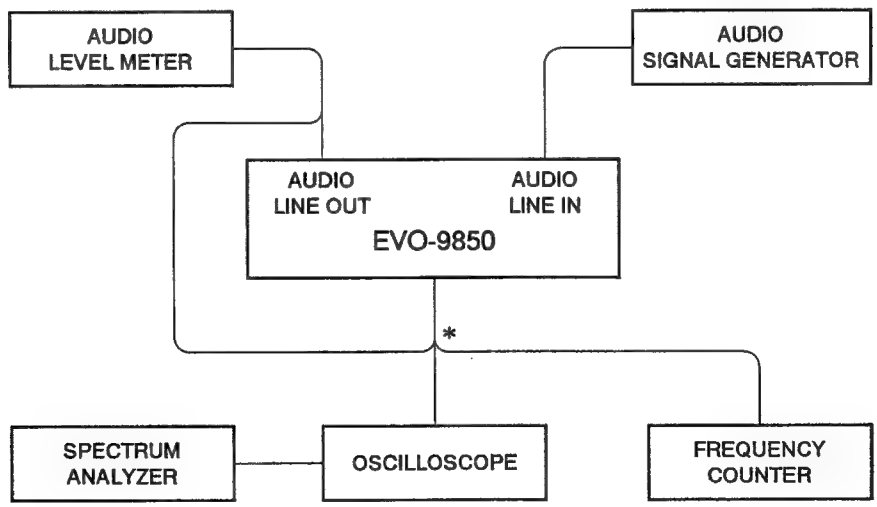
SECTION 9
AUDIO SIGNAL SYSTEM ALIGNMENT

[Equipment Required]

- Oscilloscope : TEKTRONIX 2445 or equivalent
- Frequency counter : ADVANTEST TR5821AK or equivalent
- Audio signal generator : HEWLETT PACKARD 8904 or equivalent
- Audio level meter : HEWLETT PACKARD 3400A or equivalent
- Spectrum analyzer : ADVANTEST TR4135, TR4131 or equivalent
- Alignment tape : Refer following table

Name (Part No.)	REC mode	Tape Type	Tape Speed	Contents	
				Video Area	PCM Area
SP operation check WR5-8NSE (8-967-995-43)	Hi 8	ME	SP	VIDEO SIGNAL Color-bar 4 min. Monoscope 4 min. AUDIO SIGNAL (AFM) 400 Hz 60% mod. **Note:** This tape is recorded the above signals repeatedly.	AUDIO SIGNAL (PCM) 400 Hz 20 min.
LP operation check WR5-8NLE (8-967-995-52)	Hi 8	ME	LP	VIDEO SIGNAL Color-bar 4 min. Monoscope 4 min. AUDIO SIGNAL (AFM) 400 Hz 60% mod. **Note:** This tape is recorded the above signals repeatedly.	AUDIO SIGNAL (PCM) 400 Hz 40 min.

[Connection]



Note: The connection marked * is made up the extension to AU-156 board or AU-157 board with the extension board (EX-311) when turning power off the set (EVO-9850).

9-1. REFERENCE LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) PCM : CH1/2 AFM : CH1/2 • E-E mode	Use the audio level meter. PCM CH1 (L-ch) : TP2/AU-156 (L-2) AFM CH1 (L-ch) : TP102/AU-156 (L-2) PCM CH2 (R-ch) : TP202/AU-156 (K-2) AFM CH2 (R-ch) : TP302/AU-156 (J-2) − 0.5 ± 0.1 dB	⊘ AUDIO LEVEL PCM CH1/keypanel ⊘ AUDIO LEVEL AFM CH1/keypanel ⊘ AUDIO LEVEL PCM CH2/keypanel ⊘ AUDIO LEVEL AFM CH2/keypanel

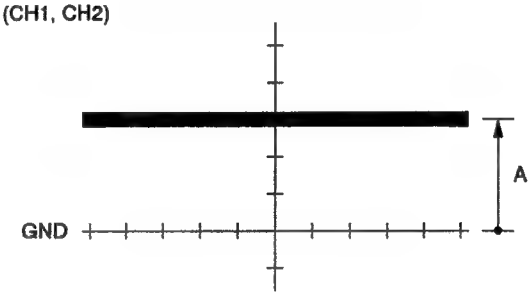
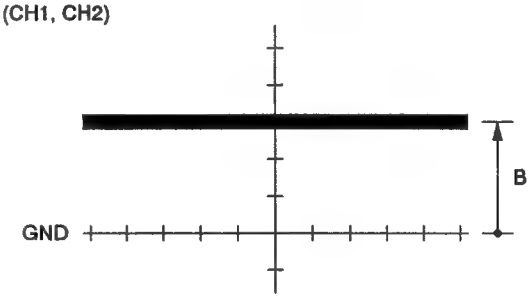
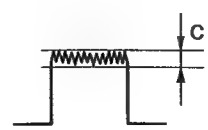
9-2. PCM LIMITER ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+34 dB CH2 : 400 Hz/+34 dB • LINE MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) PCM : CH1/2 • E-E mode	Use the audio level meter. PCM CH1 (L-ch) : TP2/AU-156 (L-2) PCM CH2 (R-ch) : TP202/AU-156 (K-2) +9.0 ± 0.1 dB	PCM CH1 : ⊘ RV1/AU-156 (M-1) PCM CH2 : ⊘ RV201/AU-156 (K-1)

9-3. AFM LIMITER ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+34 dB CH2 : 400 Hz/+34 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) AFM : CH1/2 • E-E mode	Use the audio level meter. AFM CH1 (L-ch) : TP102/AU-156 (L-2) AFM CH2 (R-ch) : TP302/AU-156 (J-2) +5.5 ± 0.1 dB	AFM CH1 : ⊘ RV101/AU-156 (L-1) AFM CH2 : ⊘ RV301/AU-156 (J-1)

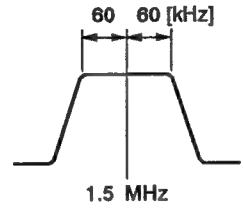
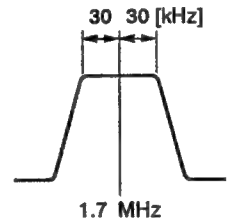
9-4. AFM I/O LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) AFM : CH1/2 Step 1 • AUDIO LINE IN CH1 : No signal CH2 : No signal • Use a Hi 8 ME tape. • Record for approximately five minutes. • OSCILLOSCOPE CH1 : 0.5 V/div DC mode CH2 : 0.5 V/div DC mode	Use the ocsilloscope. AFM CH1 (L-ch) : TP501/AU-156 (H-3) AFM CH2 (R-ch) : TP601/AU-156 (F-3) Measure the dc voltage of A. (CH1, CH2)  	
Step 2 • AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • Playback the recorded portion in step 1. • OSCILLOSCOPE CH1 : 0.5 V/div DC mode CH2 : 0.5 V/div DC mode	Use the oscilloscope. AFM CH1 (L-ch) : TP501/AU-156 (H-3) AFM CH2 (R-ch) : TP601/AU-156 (F-3) (CH1, CH2)  Adjust the CH1 and CH2 dc voltages of B so that the same as measured dc voltage of A in step 1. A = B **Note:** When turn RV volume, adjustment points are two locations. Adjust to the one location which the waveform C level is minimum.  	◐ RV501/AU-156 (G-3) ◐ RV601/AU-156 (F-3)

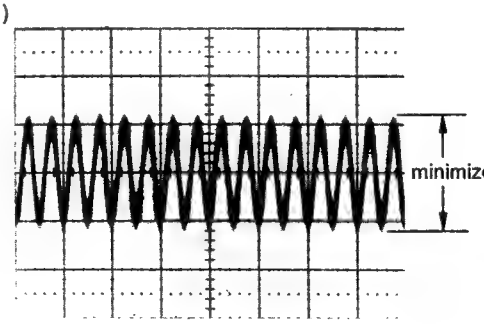
9-5. AFM CENTER CARRIER ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : No signal input CH2 : No signal input • E-E mode • Short TP750/AU-156 (E-3) to GND. • SPECTRUM ANALYZER Center freq. CF : 1.5 MHz or 1.7 MHz Span SP : 300 kHz Ref. level RL : −10 dB Sweep time ST : 3 sec. After adjusted, disconnect the short wire.	CN603-27A/AU-156 (C-4) Adjust the center carrier by using a spectrum analyzer. L-ch : 1.5 MHz R-ch : 1.7 MHz	L-ch : ⊘ RV750/AU-156 (E-3) R-ch : ⊘ RV751/AU-156 (E-3)

9-6. AFM DEVIATION ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) PCM : CH1/2 AFM : CH1/2 • E-E mode • S1/AU-156 (E-1) → BIL	Use the spectrum analyzer. AFM CH1 (L-ch) : TP502/AU-156 (H-3) Adjust the deviation within ± 60 kHz by RV502.  	◐ RV502/AU-156 (G-3)
• SPECTRUM ANALYZER Center freq. CF : 1.5 MHz or 1.7 MHz Span SP : 300 kHz Ref. level RL : − 10 dB Sweep time ST : 3 sec. After adjusted, return S1 to "AUTO".	Use the spectrum analyzer. AFM CH2 (R-ch) : TP602/AU-156 (G-3) Adjust the deviation within ± 30 kHz by RV602.  	◐ RV602/AU-156 (F-3)

9-7. AFM MATRIX REC LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB } same phase CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) AFM : CH1/2 • E-E mode • OSCILLOSCOPE CH1 : 0.5 V/div 5 ms/div TRIG: CH1	TP704/AU-156 (F-2) (CH1)  Adjust RV701 so that the amplitude of the waveform should be minimum.	◐ RV701/AU-156 (F-1)

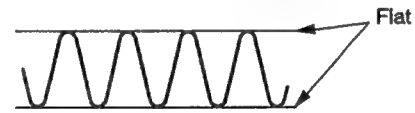
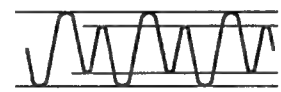
9-8. AFM R-CH REC LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : No signal input CH2 : No signal input • E-E mode • SPECTRUM ANALYZER Center freq. CF : 1.5 MHz Span SP : 1 MHz Ref. level RL : − 10 dB Sweep time ST : 3 sec.	Use the spectrum analyzer. CN603-27A/AU-156 (C-4) Adjust RV603 so that the 1.7 MHz carrier should be smaller than the 1.5 MHz carrier by 3 dB. 	⊘ RV603/AU-156 (J-1)

9-9. AFM REC CURRENT ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : No signal input CH2 : No signal input • E-E mode • OSCILLOSCOPE CH1 : 0.5 V/div DC mode	Use the oscilloscope. CN603-27A/AU-156 (C-4) +1.25 Vdc	⊘ RV503/AU-156 (H-1)

9-10. AFM PB SEPARATION ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 1 kHz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) AFM : CH1/2 Step 1 • Use a Hi 8 ME tape. • Record for approximately five minutes.		
Step 2 • Playback the recorded portion in step 1. • OSCILLOSCOPE CH1 : 0.5 V/div 5 ms/div CH2 : 0.5 V/div 5 ms/div TRIG: CH1	Use the oscilloscope. AFM CH1 (L-ch) : TP506/AU-156 (H-2) AFM CH2 (R-ch) : TP606/AU-156 (G-2) Adjust RV702 to make the flattest waveforms on the oscilloscope CH1 and CH2 without distortion.  * No good • Not flat  • Distorted 	◐ RV702/AU-156 (G-1)

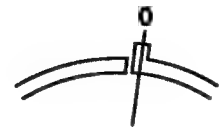
9-11. PCM LINE OUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) PCM : CH1/2 E-E mode	Use the audio level meter. AUDIO LINE OUT PCM L/rear panel AUDIO LINE OUT PCM R/rear panel +4.0 ± 0 .1 dBm	L-ch : ⊘ RV51/AU-156 (D-1) R-ch : ⊘ RV251/AU-156 (D-1)

9-12. AFM LINE OUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) AFM : CH1/2 • E-E mode	Use the audio level meter. AUDIO LINE OUT AFM L/rear panel AUDIO LINE OUT AFM R/rear panel +4.0 ± 0 .1 dBm	L-ch : ⊘ RV151/AU-156 (C-1) R-ch : ⊘ RV351/AU-156 (D-1)

9-13. AUDIO LEVEL METER ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) AFM : CH1/2 • METER SELECT switch (keypanel) AFM • E-E mode	AUDIO LEVEL METER CH1/front panel AUDIO LEVEL METER CH2/front panel  Adjust RV801 and RV851 so that CH1 and CH2 should remain in the 0 dB frame.	CH1 : ⊘ RV801/AU-156 (B-2) CH2 : ⊘ RV851/AU-156 (A-2)

9-14. RF ENVELOPE BIAS ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) AFM : CH1/2 • E-E mode • OSCILLOSCOPE CH1 : 0.2 V/div DC mode	Use the oscilloscope. CN604-28A/AU-156 (H-4) 0.10 ± 0.03 Vdc	⊘ RV1001/AU-156 (J-1)

9-15. PCM REC MASTER CLOCK FREQUENCY ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : No signal input CH2 : No signal input • E-E mode • Short TP703/AU-157 (E-5) to TP704/AU-157 (E-4). • Short TP708/AU-157 (F-2) to TP709/AU-157 (F-2). After adjusted, disconnect the short wires.	Use the frequency counter. TP701/AU-157 (G-2) 11.58 ± 0.01 MHz	⊘ CV701/AU-157 (F-3)

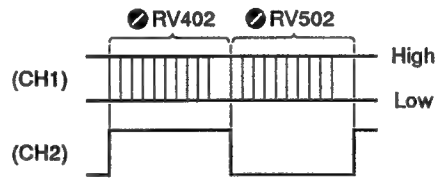
9-16. PCM PB MASTER CLOCK FREQUENCY ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : No signal input CH2 : No signal input • E-E mode • Short TP807/AU-157 (H-4) to TP808/AU-157 (H-4). • Short TP811/AU-157 (F-4) to TP812/AU-157 (G-3). After adjusted, disconnect the short wires.	Use the frequency counter. TP806/AU-157 (H-2) 11.58 ± 0.01 MHz	⊘ CV801/AU-157 (G-4)

9-17. PCM PB VCO FREQUENCY ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) PCM : CH1/2 • E-E mode	Use the frequency counter. TP805/AU-157 (F-4) 11.45 ± 0.01 MHz	⊘ RV803/AU-157 (F-4)

9-18. PCM A/D CONVERTER OFFSET ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) PCM : CH1/2 • E-E mode • OSCILLOSCOPE CH1 : 0.5 V/div 5 ms/div CH2 : 0.5 v/div 5 ms/div TRIG: CH2	Use the oscilloscope. CH1 : TP404/AU-157 (M-1) CH2 : TP405/AU-157 (M-1)  Adjust RV402 and RV502 so that the brightness at the high level on CH1 is the same as that at the low level.	⊘ RV402/AU-157 (N-3) ⊘ RV502/AU-157 (N-3)

9-19. PCM D/A CONVERTER GAIN ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Playback the PCM 400 Hz portion of the alignment tape WR5-8NSE.	Use the audio level meter. AUDIO LINE OUT PCM L/rear panel AUDIO LINE OUT PCM R/rear panel The average at L and R should be +4 ± 0.1 dBm.	⊘ RV408/AU-157 (K-1)

9-20. PCM A/D CONVERTER GAIN ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• AUDIO LINE IN CH1 : 400 Hz/+4 dB CH2 : 400 Hz/+4 dB • LINE/MIC SELECT switch (rear panel) CH1 : LINE CH2 : LINE • INPUT SELECT switch (sub-panel) PCM : CH1/2 Step 1 • Use a Hi 8 ME tape. • Record for approximately five minutes. • Playback the recorded portion.	Use the audio level meter. AUDIO LINE OUT PCM L/rear panel → A AUDIO LINE OUT PCM R/rear panel → B Measure the audio levels A and B. When the A and B are already following values, so steps 2 and 3 need not be performed. A = +4.0 ± 0.1 dBm B = +4.0 ± 0.1 dBm	
Step 2 • E-E mode	TP406/AU-157 (L-2) → C Measure C, and calculate the following formula. $C - \frac{A-4}{2}$ (dB) Adjust to the calculated value. (Example) When the A is 4.2 dB and C is − 30 dB. $-30 - \frac{4.2-4}{2}$ (dB) $-30 - 0.1 = \boxed{-30.1\ \text{dB}}$	⊘ RV403/AU-157 (L-1)
Step 3 • E-E mode After adjusted, check by repeating step 1.	TP506/AU-157 (N-2) → D Measure D, and calculate the following formula. $D - \frac{B-4}{2}$ (dB) Adjust to the calculated value.	⊘ RV503/AU-157 (N-1)

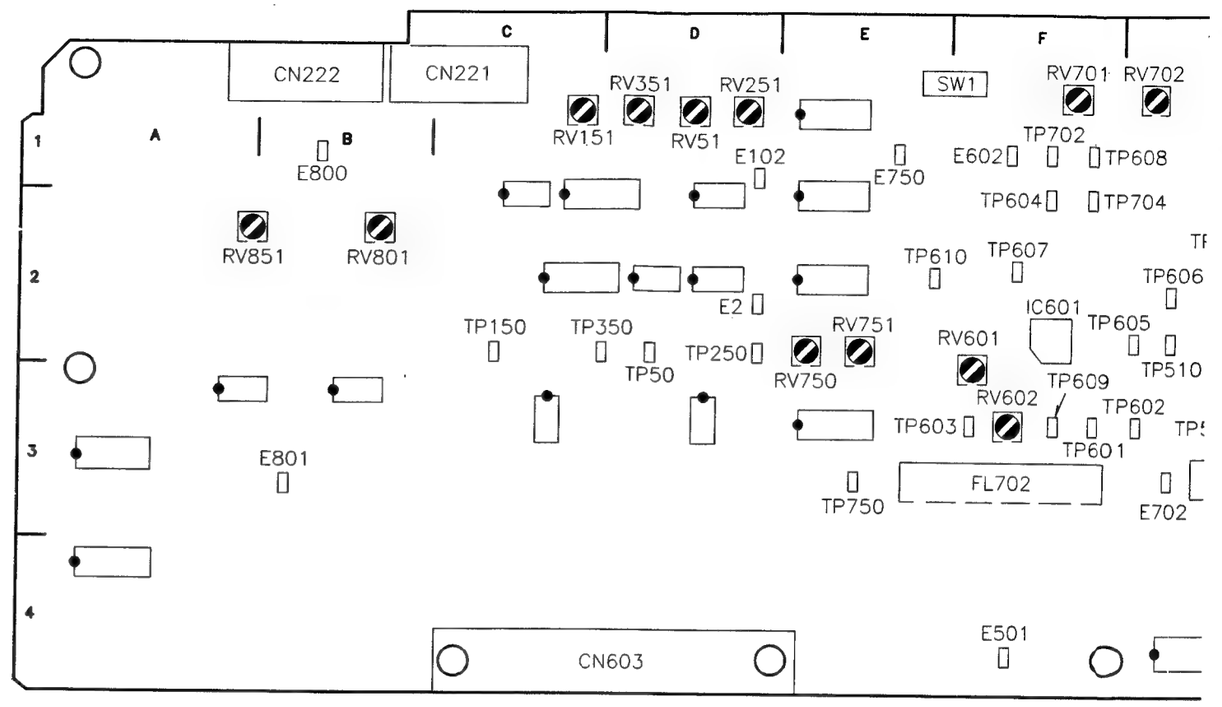
AU-156 BOARD

Ref. No.	Page
RV1	8-6, 9-2
RV51	9-8
RV101	9-2
RV151	9-8
RV201	9-2
RV251	9-8
RV301	9-2
RV351	9-8
RV501	9-3
RV502	9-5
RV503	9-6
RV601	9-3
RV602	9-5
RV603	9-6
RV701	9-5
RV702	9-7
RV750	9-4
RV751	9-4
RV801	9-9
RV851	9-9
RV1001	9-9

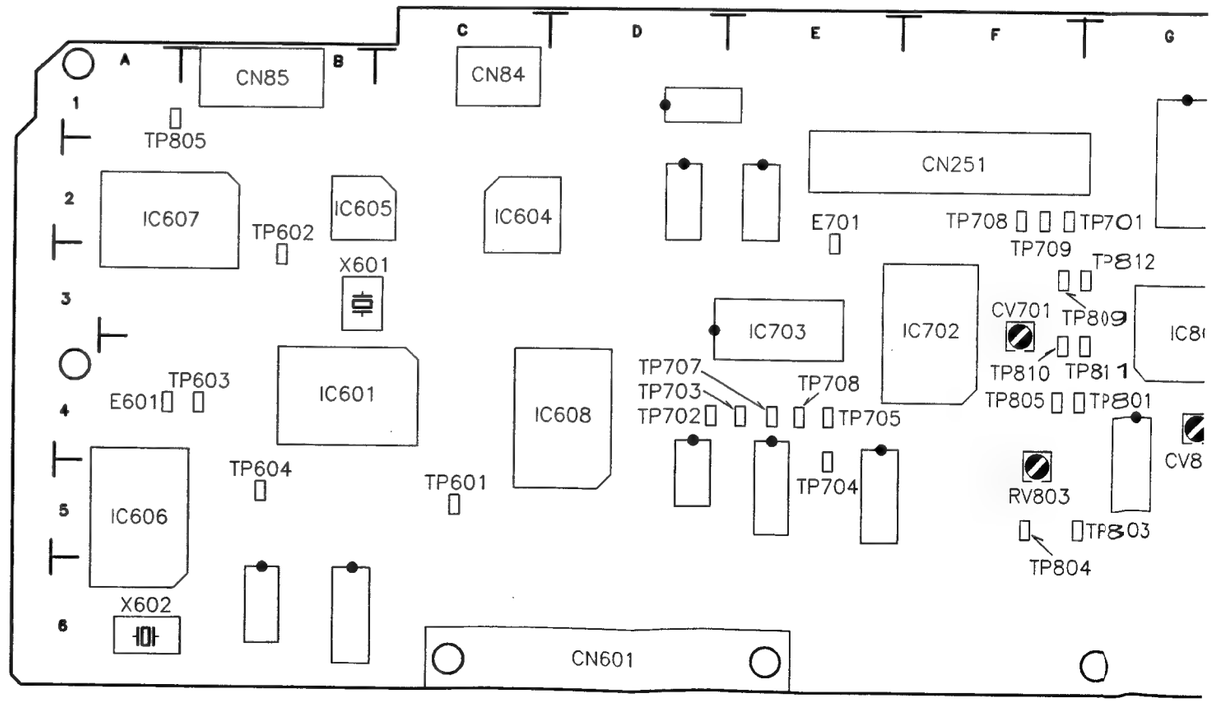
AU-157 BOARD

Ref. No.	Page
CV701	9-10
CV801	9-10
RV402	9-11
RV403	9-12
RV408	9-11
RV502	9-11
RV503	9-12
RV803	9-11

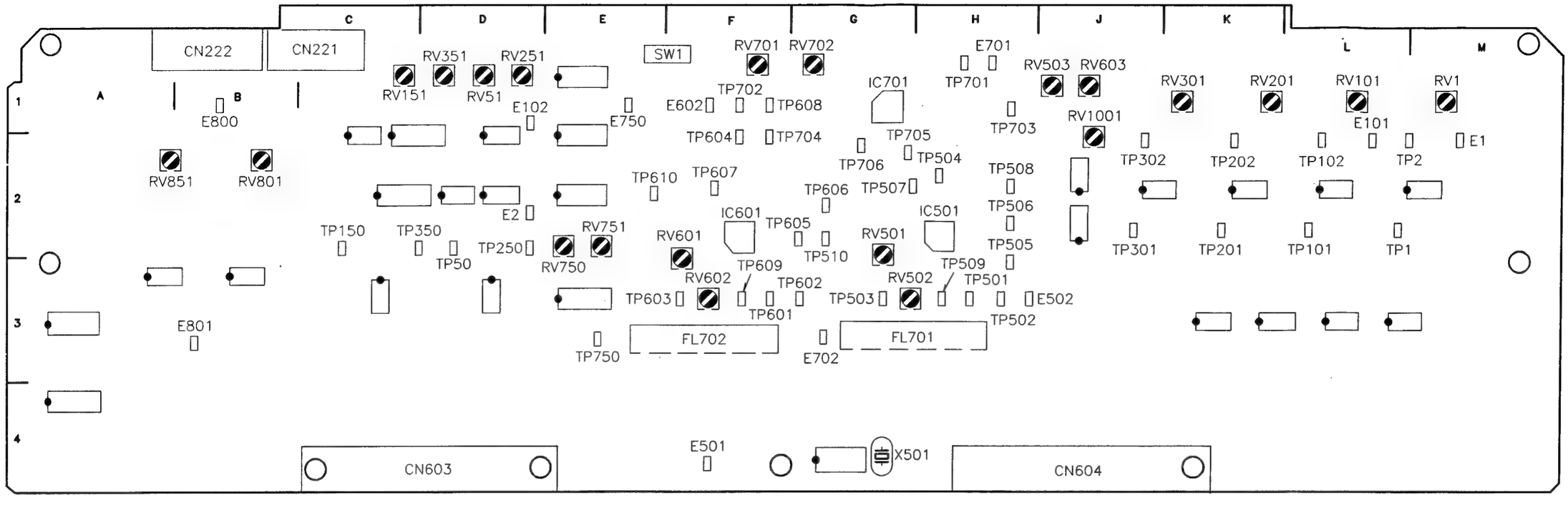
Locations of RVs on AU-156 Board.



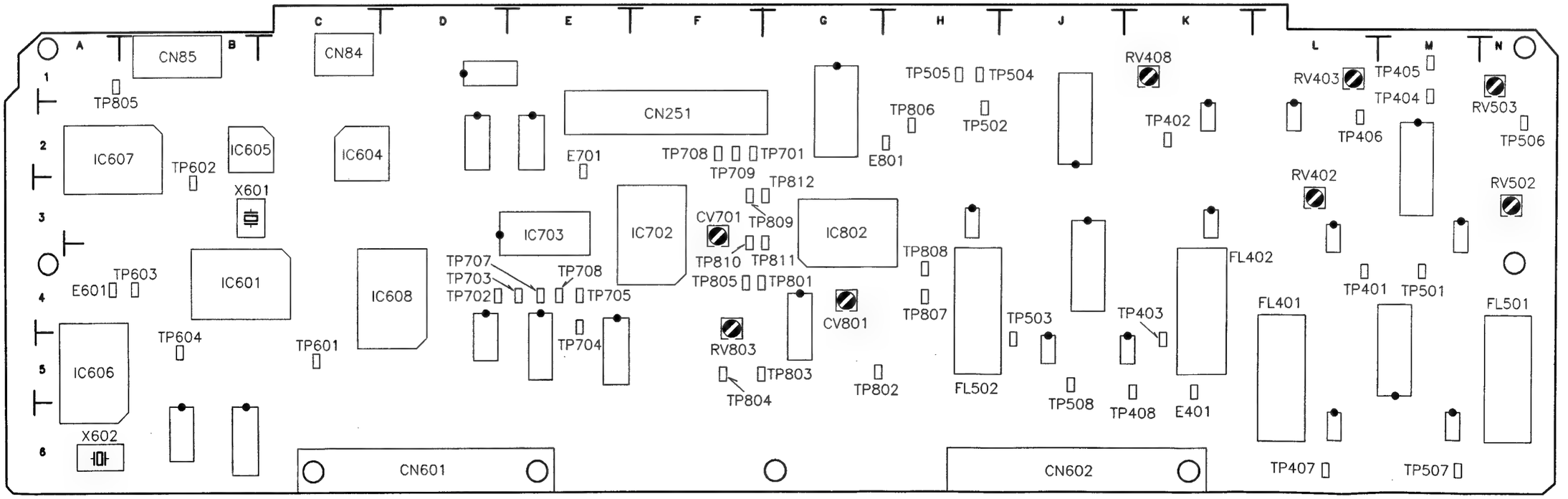
Locations of RVs and CVs on AU-157 Board.



Locations of RVs on AU-156 Board.



Locations of RVs and CVs on AU-157 Board.



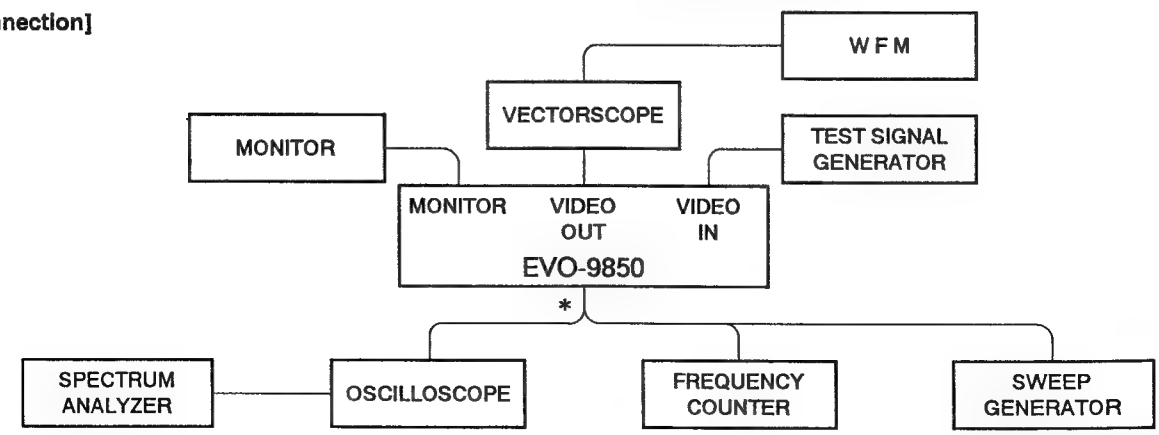
SECTION 10
VIDEO SIGNAL SYSTEM ALIGNMENT

[Equipment Required]

- Oscilloscope : TEKTRONIX 2445 ro equivalent
- WFM : TEKTRONIX 1485R or equivalent
- Frequency counter : ADVANTEST TR5821AK or equivalent
- Test signal generator : TEKTRONIX 1410 or equivalent
- Vectorscope : TEKTRONIX 1780 or equivalent
- Spectrum analyzer : ADVANTEST TR4135, TR4131 or equivalent
- Sweep generator : SHIBASOKU VS-12CX or equivalent
- Y/C signal generator : TEKTRONIX TSG-130 or equivalent
- Alignment tape : Refer following table

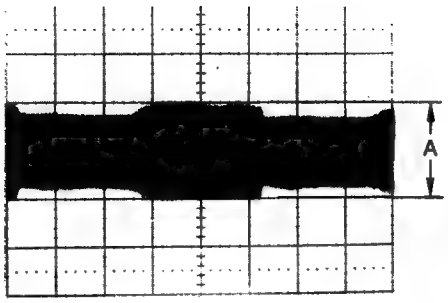
Name (Part No.)	REC mode	Tape Type	Tape Speed	Contents	
				Video Area	PCM Area
Video freq. resp. WR5-7NE (8-967-995-13)	Hi 8	ME	SP	RF sweep 0 – 15 MHz Marker : 2.0 MHz, 4.5 MHz 7.0 MHz, 8.5 MHz 10.0 MHz	
Video freq. resp. WR5-6N (8-967-995-12)	STD	MP	SP	Locked sweep Marker : 1.0 MHz, 3.58 MHz 5.5 MHz, 7.0 MHz	
SP operation check WR5-5NSP (8-967-995-42)	STD	MP	SP	VIDEO SIGNAL Color-bar 4 min. Monoscope 4 min. AUDIO SIGNAL (AFM) 400 Hz 60% mod.	AUDIO SIGNAL (PCM) Monoscope Section 20 Hz 20 sec. 400 Hz 20 sec. 14 kHz 20 sec. Color-bar Section 1 kHz 4 min.
SP operation check WR5-8NSE (8-967-995-43)	Hi 8	ME	SP	**Note:** This tape is recorded the above signals repeatedly.	AUDIO SIGNAL (PCM) 400 Hz 20 min.
LP opration check WR5-8NLE (8-967-995-52)	Hi 8	ME	LP	VIDEO SIGNAL Color-bar 4 min. Monoscope 4 min. AUDIO SIGNAL (AFM) 400 Hz 60% mod. **Note:** This tape is recorded the above signals repeatedly.	AUDIO SIGNAL 400 Hz 40 min.

[Connection]

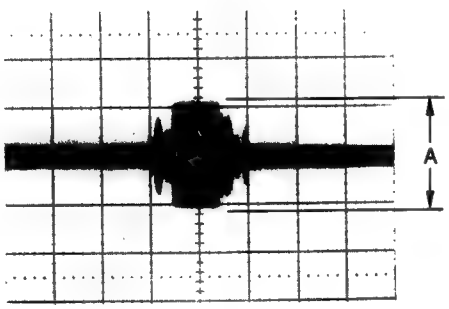


Note: The connection marked * is made up the extension to DM-87, TBC-21, MD-81 or VA-111 board with the extension board (EX-311) when turning power off the set (EVO-9850).

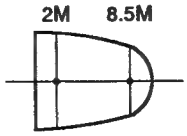
10-1. PB RF LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : 50 % flat field signal • Use a Hi 8 ME tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 50 mV/div 20 μs/div TRIG: CH1	TP1/DM-87 (A-4) (CH1)  A = 100 ± 5 mVp-p	Ach : ⊘ RV1/PRE-10 (B-1) Bch : ⊘ RV2/PRE-10 (B-1)

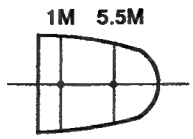
10-2. PCM RF LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • Use a Hi 8 ME tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: CH1	TP4/PRE-10 (E-1) (CH1)  A = 250 ± 10 mVp-p	Ach : ⊘ RV3/PRE-10 (B-2) Bch : ⊘ RV4/PRE-10 (C-2)

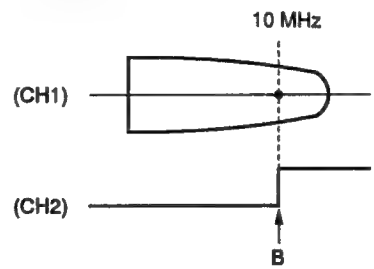
10-3. PB RF FREQUENCY RESPONSE ADJUSTMENT (HI 8)

Machine condition for adjustment	Specifications	Adjustments
• Playback the alignment tape WR5-7NE. · Short TP6/PRE-10 (E-1) to +5 V line. • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: CH1	TP3/PRE-10 (E-1) (CH1)  2 MHz (Reference) 8.5 MHz 100 % 45 ± 5 %	Ach : ⊘ RV6/PRE-10 (D-1) Bch : ⊘ RV5/PRE-10 (D-1)

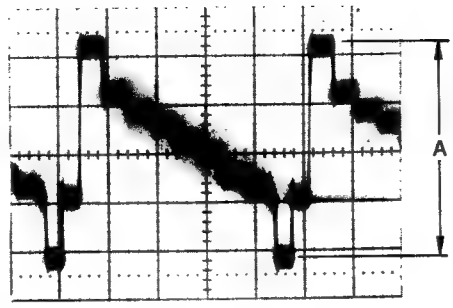
10-4. PB RF FREQUENCY RESPONSE ADJUSTMENT (NORMAL)

Machine condition for adjustment	Specifications	Adjustments
• Playback the alignment tape WR5-6N. · Short TP6/PRE-10 (E-1) to GND. • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: CH1	TP3/PRE-10 (E-1) (CH1)  1 MHz (Reference) 5.5 MHz 100 % 70 ± 5 %	Ach : ⊘ RV8/PRE-10 (D-1) Bch : ⊘ RV7/PRE-10 (D-1)

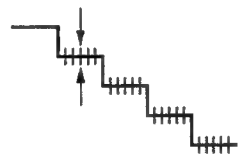
10-5. DOC LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
· Short TP4/DM-92 (H-2) to GND. · Short TP6/PRE-10 (E-1) to +5 V line. · Playback the alignment tape WR5-7NE. (HI8 ME) • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div CH2 : 0.1 V/div 20 μs/div TRIG: CH2	CH1 : TP28/DM-87 (D-3) CH2 : TP29/DM-87 (F-3)  Adjust B phase to 10 MHz marker position.	⊘ RV11/DM-87 (D-3)

10-6. DEMODULATION Y LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Playback the color-bar signal on the alignment tape WR5- 8NSE. • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP32/DM-87 (F-2) (CH1)  A = 0.500 ± 0.025 Vp-p	⊘ RV702/DM-87 (C-3)

10-7. IR ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Feed color-bar signals to TP20 /DM-87(G-1). • STOP mode (E-E mode) • Short between TP31/DM-87 (E-2) and TP33/DM-87 (D-2). • Short TP701/DM-87 (C-4) to GND. • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP23/DM-87 (H-2) After adjusted, disconnect the short wires.	TP32/DM-87 (F-2) (CH1)  Minimize the chroma component.	⊘ RV13/DM-87 (D-2)

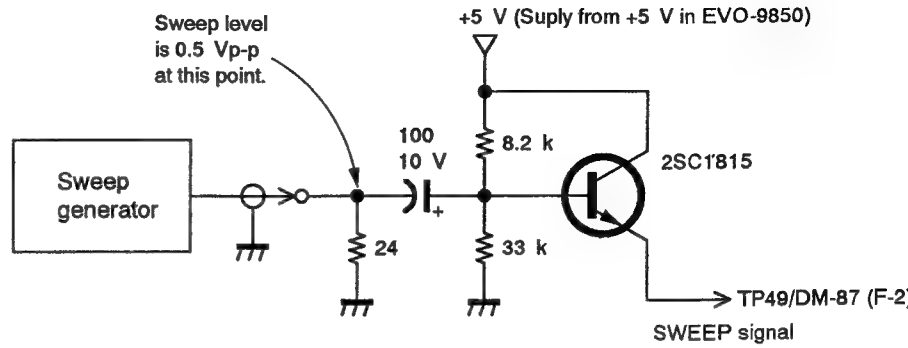
10-8. PB Y FREQUENCY RESPONSE ADJUSTMENT (HI 8)

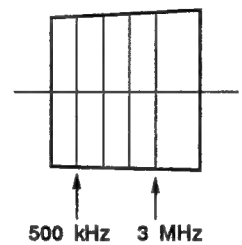
This adjustment is not nessesary in the ordinal service operation.

When perform this adjustment, need following tool.

(PART REQUIRED)

- Transistor
  2SC1815 : 8-729-281-51
- Resistors
  24 Ω : 1-247-792-11
  8.2 kΩ : 1-249-428-11
  33 kΩ : 1-249-435-11
- Capacitor
  100 μF 10 V : 1-126-177-11



Machine condition for adjustment	Specifications	Adjustments
• Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • Feed SWEEP signal to TP49/DM-87 (F-2). • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: CH1	TP35/FL-130 (H-3/DM-87) (CH1)  3 MHz level is 106 ± 5% (When 500 kHz is 100%)	◐ CT1/FL-130 (F-4/DM-87)

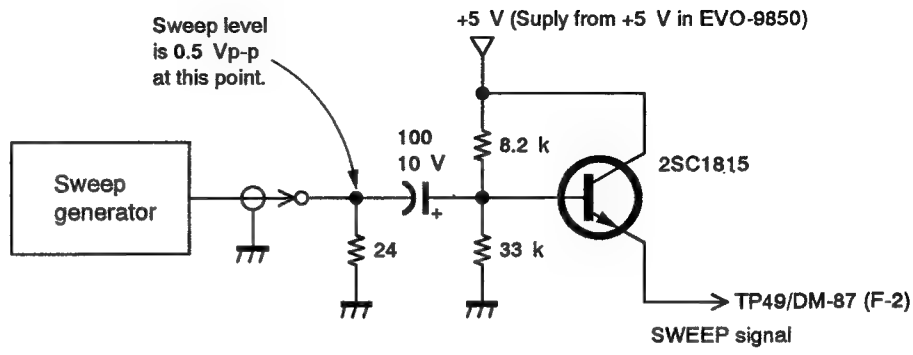
10-9. PB Y FREQUENCY RESPONSE ADJUSTMENT (STD)

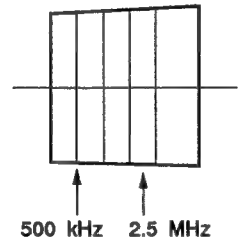
This adjustment is not nessesary in the ordinal service operation.

When perform this adjustment, need following tool.

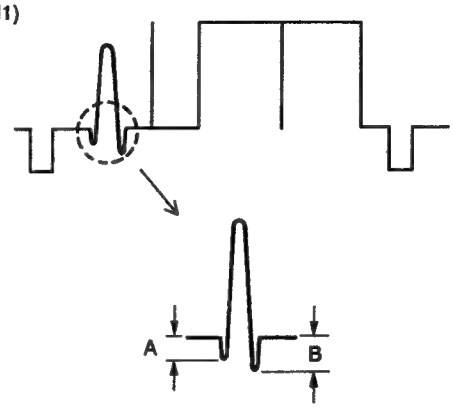
(PART REQUIRED)

- Transistor
  2SC1815 : 8-729-281-51
- Resistors
  24 Ω : 1-247-792-11
  8.2 kΩ : 1-249-428-11
  33 kΩ : 1-249-435-11
- Capacitor
  100 μF 10 V : 1-126-177-11



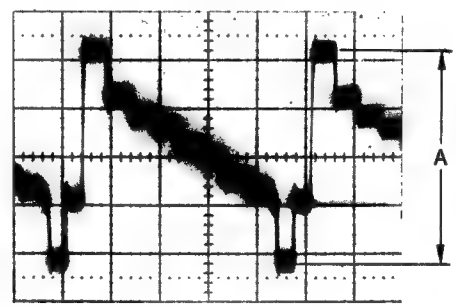
Machine condition for adjustment	Specifications	Adjustments
• Insert the STD MP tape to put into the STD mode. • STOP mode • Feed SWEEP signal to TP49/DM-87 (F-2). • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: CH1	TP35/FL-130 (H-3/DM-87) (CH1)  2.5 MHz level is 106 ± 5% (When 500 kHz is 100%)	◐ CT2/FL-131 (D-3/DM-87)

10-10. PB Y PHASE ADJUSTMENT (STD)

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : Pulse & Bar signal • Insert a STD MP tape into VTR to set STD mode. • STOP mode. • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div delay mode TRIG: TP23/DM-87 (H-2)	TP35/FL-130 (H-3/DM-87) (CH1)  A = B	◐ RV15/FL-131 (E-3/DM-87)

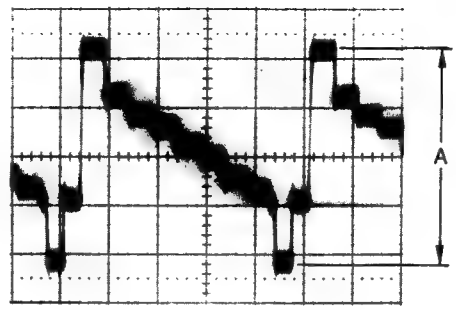
10-11. E-E Y SIGNAL LEVEL ADJUSTMENT (Hi 8)

Before performing this adjustment, MD board adjustments should be completed.

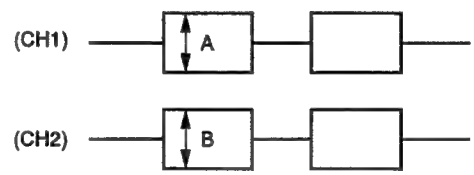
Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • Use a Hi 8 ME tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: CH1	TP23/DM-87 (H-2) (CH1)  A = 1.00 ± 0.05 Vp-p	◐ RV9/DM-87 (F-1)

10-12. E-E Y SIGNAL LEVEL ADJUSTMENT (STD)

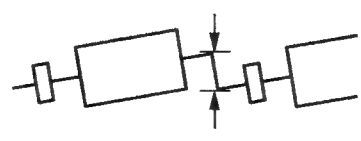
Before performing this adjustment, MD board adjustments should be completed.

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • Use a STD MP tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: CH1	TP23/DM-87 (H-2) (CH1)  A = 1.00 ± 0.05 Vp-p	● RV8/DM-87 (F-1)

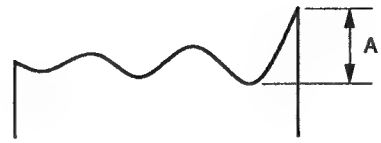
10-13. LINE DG COMPENSATION LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : RED field signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • Turn RV18/CR-40 (K-1/DM-87) fully counterclockwise. • OSCILLOSCOPE CH1 : 50 mV/div 20 μs/div CH2 : 50 mV/div 20 μs/div TRIG: TP23/DM-87 (H-2)	CH1 : TP40/CR-40 (M-1/DM-87) CH2 : TP42/DM-87 (J-2)  A = B	● RV20/CR-40 (L-1/DM-87) The level changes when it is turned counterclockwise from the fully clockwise position. The adjustment should be completed at its first change.

10-14. LINE DG COMPENSATION DC ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : RED field signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • OSCILLOSCOPE CH1 : 50 mV/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP40/CR-40 (M-1/DM-87) (CH1)  minimize	● RV21/CR-40 (L-1/DM-87)

10-15. LINE DG COMPENSATION GAIN ADJUSTMENT (Hi 8-ME)

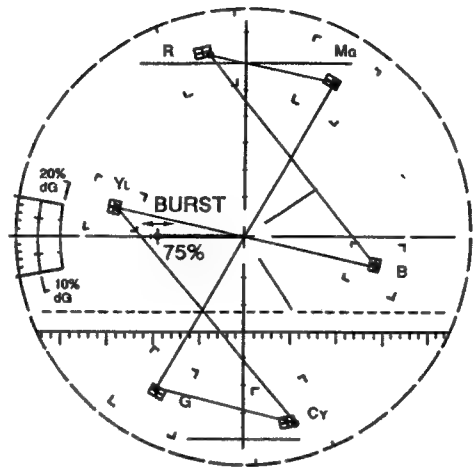
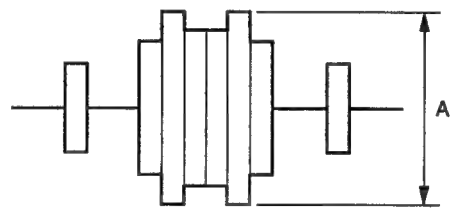
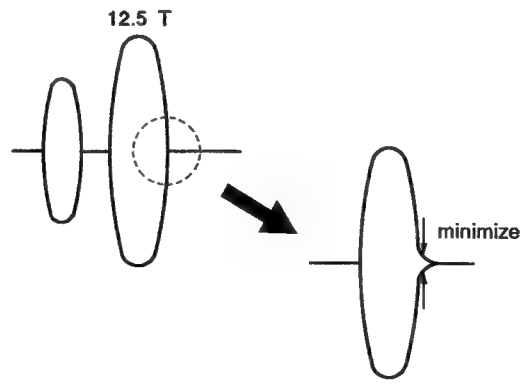
Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : MOD RAMP signal • Use a Hi 8 ME tape. • Record and playback the tape. • Vectorscope : DG mode	Use the vectorscope. VIDEO OUT  Minimize A level.	⊘ RV18/CR-40 (K-1/DM-87)

10-16. LINE DG COMPENSATION GAIN ADJUSTMENT (Hi 8-MP)

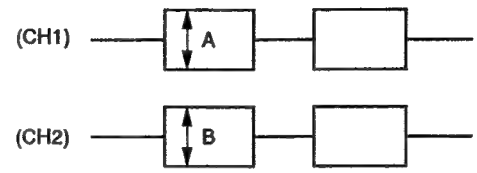
Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : MOD RAMP signal • Use a Hi 8 MP tape. • Record and playback the tape. • Vectorscope : DG mode	Use the vectorscope. VIDEO OUT Minimize A level.	⊘ RV19/CR-40 (K-1/DM-87)

10-17. CROSSTALK 1H DELAY PHASE/VCA GAIN ADJUSTMENT

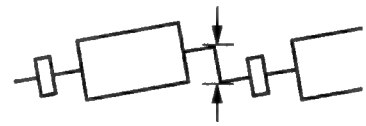
Before performing this adjustment, TBC board should be removed.

Machine condition for adjustment	Specifications	Adjustments
Step 1 • VIDEO IN : color-bar signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • Set the gain volume of the vector-scope to FIX.	 RV28 : Set BURST to the 75% position. RV10, 12 : Put it touch the "⊞" box.	● RV28/DM-87 (M-2) ● RV10/DM-87 (D-1) ● RV12/DM-87 (D-2)
Step 2 • VIDEO IN : color-bar signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP15/DM-87 (N-2) (CH1)  A = 0.6 Vp-p	● RV28/DM-87 (M-2)
Step 3 • VIDEO IN : Palse & Bar signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP15/DM-87 (N-2) (CH1) 	● FL9/DM-87 (K-2)

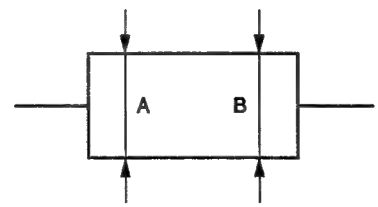
10-18. DUB DG COMPENSATION LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : RED field signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • Turn RV23/CR-41 (K-1/DM-87) fully counterclockwise. • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div CH2 : 0.2 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	CH1 : TP48/DM-87 (L-2) CH2 : TP51/CR-41 (M-1/DM-87)  A = B	⊘ RV25/CR-41 (L-1/DM-87) The level changes when it is turned counterclockwise from the fully clockwise position. The adjustment should be completed at its first change.

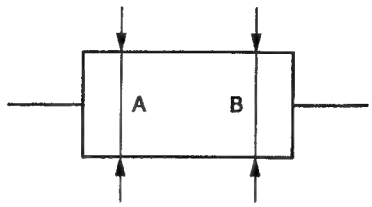
10-19. DUB DG COMPENSATION DC ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : RED field signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP51/CR-41 (M-1/DM-87) (CH1)  minimize	⊘ RV26/CR-41 (L-1/DM-87)

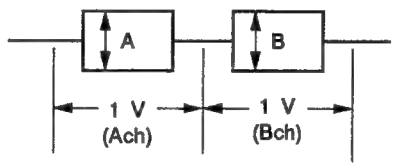
10-20. DUB DG COMPENSATION GAIN ADJUSTMENT (HI 8-ME)

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : MOD RAMP signal • Use a Hi 8 ME tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP50/CR-41 (M-1/DM-87) (CH1)  A = B	⊘ RV23/CR-41 (K-1/DM-87)

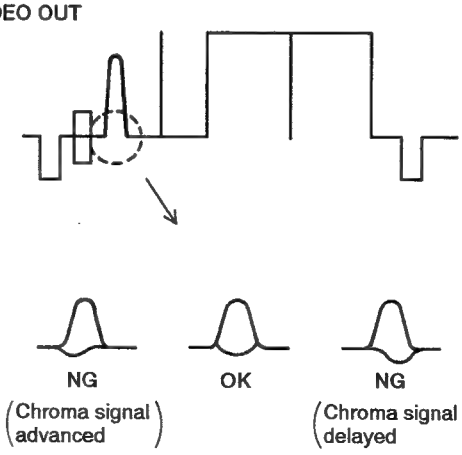
10-21. DUB DG COMPENSATION GAIN ADJUSTMENT (Hi 8-MP)

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : MOD RAMP signal • Use a STD MP tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP50/CR-41 (M-1/DM-87) (CH1)  A = B	⊘ RV24/CR-41 (L-1/DM-87)

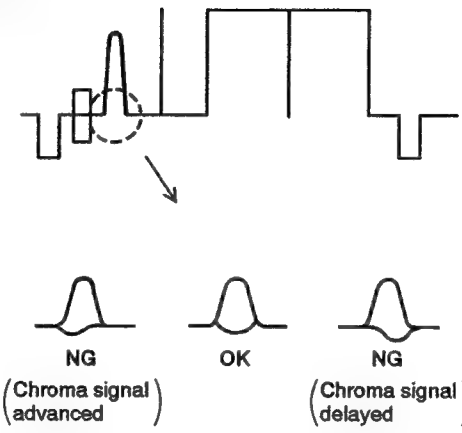
10-22. PB CHROMA RF LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • Use a Hi 8 ME tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 50 mV/div 2 ms/div TRIG: TP23/DM-87 (H-2)	Oscilloscope V rate TP11/DM-87 (L-3) (CH1)  100 ± 5 mVp-p Same level as A and B	Ach : ⊘ RV2/FL-129 (K-3/DM-87) Bch : ⊘ RV3/FL-129 (K-3/DM-87)

10-23. PB Y/C DELAY ADJUSTMENT (HI 8)

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : Pulse & Bar signal • Use a Hi 8 ME tape. • Record and playback the tape.	Use the WFM. VIDEO OUT  	⊘ RV4/FL-129 (K-3/DM-87)

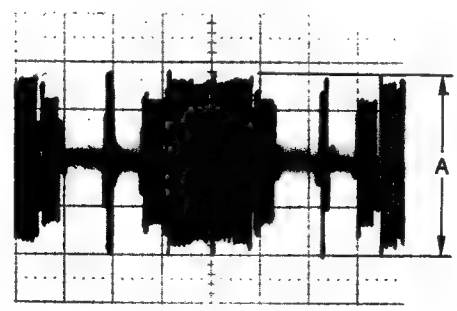
10-24. PB Y/C DELAY ADJUSTMENT (STD)

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : Pulse & Bar signal • Use a STD MP tape. • Record and playback the tape.	Use the WFM. VIDEO OUT  	⊘ RV5/FL-129 (L-3/DM-87)

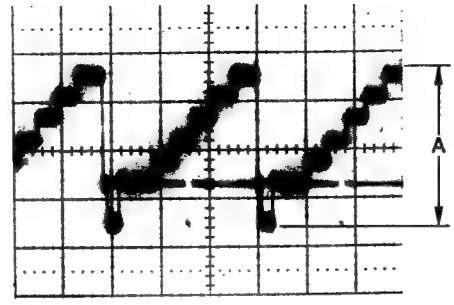
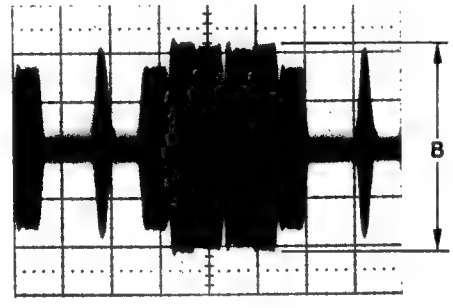
10-25. 3.58 MHz REF ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• E-E mode	Use the frequency counter. TP47/DM-87 (L-3) 3579545 ± 20 Hz	⊘ CT3/DM-87 (L-3)

10-26. PB DUB CHROMA LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • STOP mode • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP50/CR-41 (N-1/DM-87) (CH1)  A = 0.60 ± 0.03 Vp-p	⊘ RV27/CR-41 (N-1/DM-87)

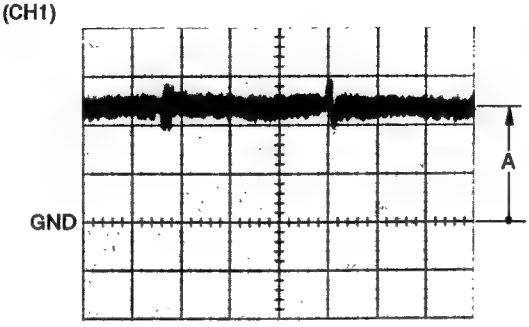
10-27. Y/C INPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : 5 steps signal • E-E mode • OSCILLOSCOPE CH1 : 0.5 V/div 20 μs/div TRIG: CH1	TP403/TBC-21 (M-5) (CH1)  A = 1.50 ± 0.05 Vp-p	⊘ RV401/TBC-21 (M-6)
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP403/TBC-21 (M-5)	TP402/TBC-21 (M-4) (CH1)  B = 1.10 ± 0.05 Vp-p	⊘ RV402/TBC-21 (N-5)

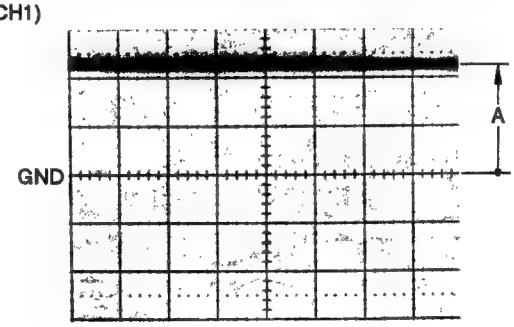
10-28. AFC ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• NOISE REDUCTION SW : 2 • VIDEO IN : color-bar signal • E-E mode	Use the frequency counter. TP404/TBC-21 (M-2) 2.4 ± 0.1 Vdc	⊘ CV401/TBC-21 (N-2)

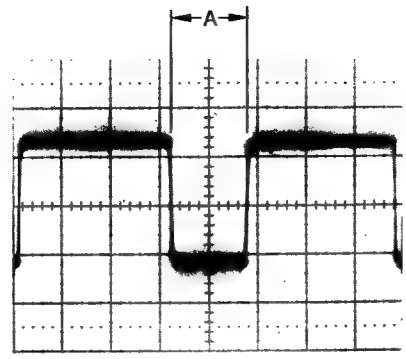
10-29. APC ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 1 V/div 5 ms/div DC mode	TP408/TBC-21 (L-6) (CH1)  A = 2.5 ± 0.1 Vdc	◉ RV403/TBC-21 (L-6)

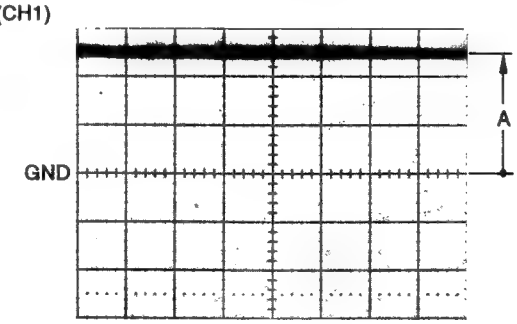
10-30. INTERNAL SC LOCK ADJUSTMENT

Machine condition for adjustmnet	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • REF IN : No signal input • OSCILLOSCOPE CH1 : 1 V/div 5 ms/div DC mode	TP4/TBC-21 (B-5) (CH1)  A = 2.3 ± 0.1 Vdc	◉ RV4/TBC-21 (A-4)

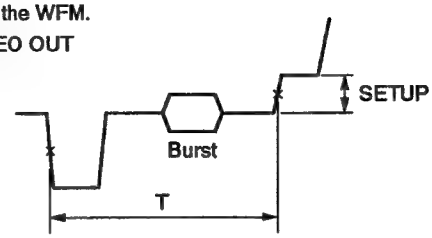
10-31. SC PHASE ADJUSTMENT

Machine condition for adjustmnet	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 0.2 V/div 0.1 μs/div TRIG: TP403/TBC-21 (M-5)	TP10/TBC-21 (A-3) (CH1)  A = 180 ± 20 ns	⊘ RV2/TBC-21 (B-3)

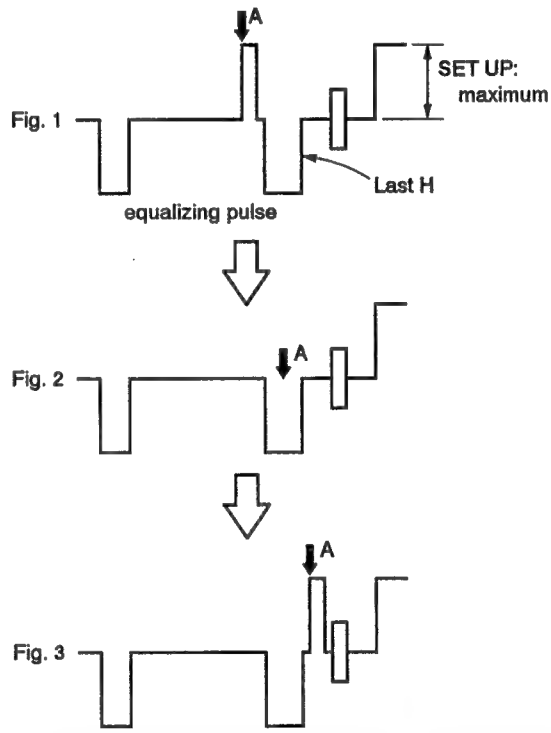
10-32. Y READ CLOCK LOCKING ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 1 V/div 5 ms/div DC mode	TP703/TBC-21 (F-5) (CH1)  A = 2.5 ± 0.1 Vdc	⊘ LV701/TBC-21 (F-5)

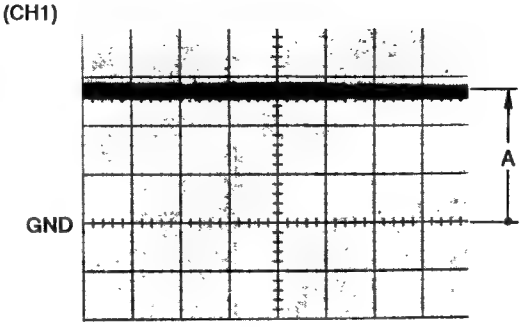
10-33. H BLANKING ADJUSTMENT

Machine condition for adjustmnet	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • SETUP control : maximum (sub control panel) After adjusted, turn back SETUP control to zero level.	Use the WFM. VIDEO OUT  T = 9.4 ± 0.1 μs	RV701/TBC-21 (E-2)

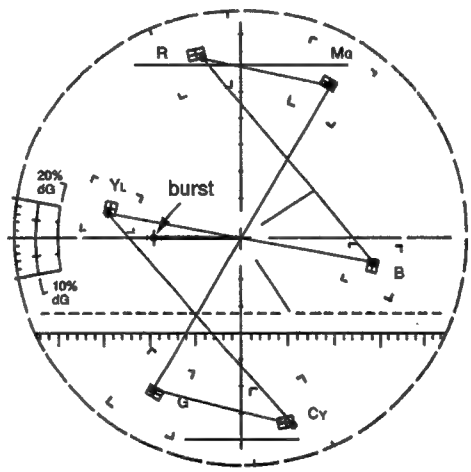
10-34. V BLANKING ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustment
• VIDEO IN : color-bar signal • E-E mode • SETUP control : maximum (sub control panel) After adjusted, turn back SETUP control to zero level.	Use the WFM. VIDEO OUT  Adjust the A point of the pulse so that the pulse A is in the center of last H-blanking pulse during the equalizing pulse shown in Fig. 2. (comment) Like the above Fig. 2, this adjustment position A could not be confirmed on the WFM. Adjust sensibly so that the position A is center between the A of Fig. 1 and the A of Fig. 3.	RV702/TBC-21 (E-3)

10-35. ENCODE CLOCK LOCKING ADJUSTMENT

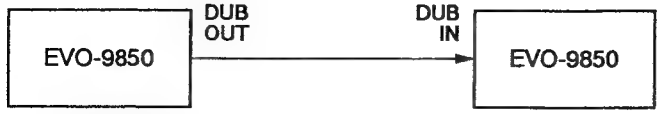
Machine condition for adjustment	Specifications	Adjustment
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 1 V/div. 5 ms/div DC mode	TP12/TBC-21 (D-1) (CH1)  A = 2.5 ± 0.1 Vdc	◐ LV3/TBC-21 (D-2)

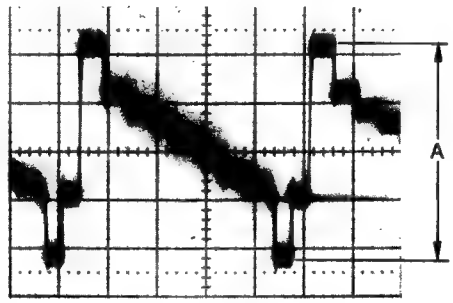
10-36. HUE ADJUSTMENT

Machine condition for adjustmnet	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • TBC control : LOCAL	VIDEO OUT Set the vectorscope's burst phase to 180°. Set the bright spots on the vectorscope into the small "⊞" box (RED reference).  	◐ RV3/TBC-21 (C-1)

10-37. DUB Y INPUT LEVEL ADJUSTMENT

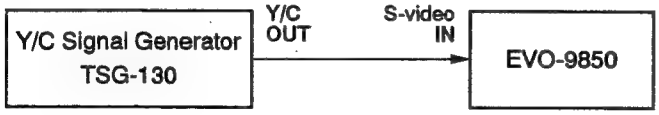
(CONNECTION)

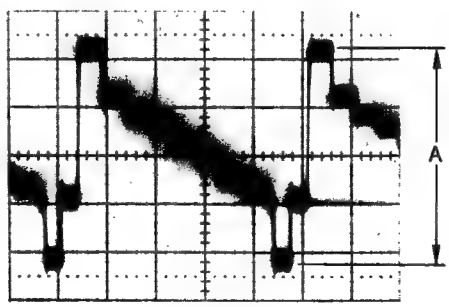


Machine condition for adjustment	Specifications	Adjustments
• DUB IN : color-bar signal • INPUT SELECT switch : DUB • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: CH1	TP5/MD-81 (F-3) (CH1)  A = 0.45 ± 0.02 Vp-p	⊘ RV4/MD-81 (F-1)

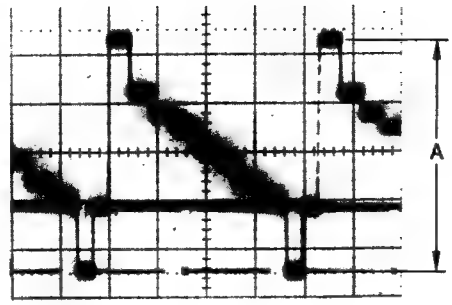
10-38. S-TERMINAL Y INPUT LEVEL ADJUSTMENT

(CONNECTION)

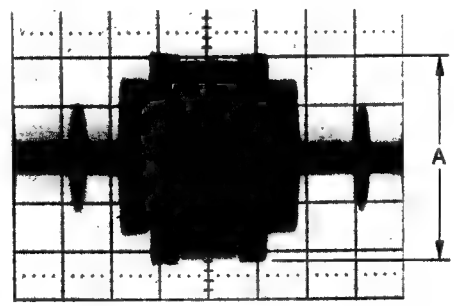


Machine condition for adjustment	Specifications	Adjustments
• S VIDEO IN : color-bar signal • INPUT SELECT switch : S • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: CH1	TP5/MD-81 (F-3) (CH1)  A = 0.45 ± 0.02 Vp-p	⊘ RV1/MD-81 (B-4)

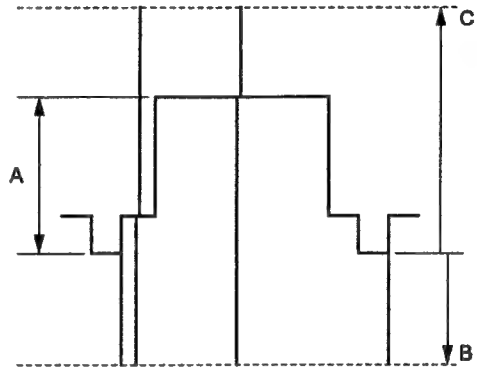
10-39. LINE Y INPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN: color-bar signal • INPUT SELECT switch: LINE • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: CH1	TP5/MD-81 (F-3) (CH1)  A = 0.45 ± 0.02 Vp-p	⊘ RV2/MD-81 (A-1)

10-40. LINE CHROMA INPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 50 mV/div 20 μs/div TRIG: TP5/MD-81 (F-3)	TP8/MD-81 (F-2) (CH1)  A = 0.20 ± 0.02 Vp-p	⊘ RV3/MD-81 (A-1)

10-41. WHITE/DARK CLIP ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : Pulse & Bar signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • E-E mode • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP5/MD-81 (F-3)	TP18/MD-81 (D-1) (CH1)  When A = 100% is set Dark clip level : B = 95 ± 5% White clip level : C = 200 ± 5%	Dark clip : ● RV10/MD-81 (D-1) White clip : ● RV700/MD-81 (D-1)

10-42. Y FM CARRIER ADJUSTMENT (Hi 8)

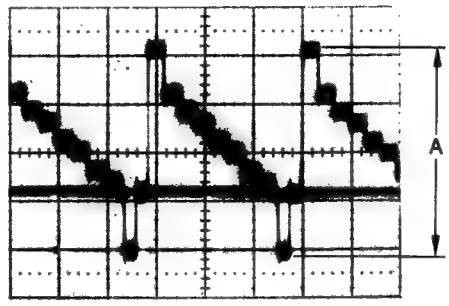
Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : No signal input • E-E mode	Use the frequency counter. TP15/MD-81 (F-1) 6.00 ± 0.02 MHz	● RV5/MD-81 (D-1)

10-43. Y FM CARRIER ADJUSTMENT (STD)

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : No signal input • Insert STD MP tape into VTR to set STD mode. • E-E mode	Use the frequency counter. TP15/MD-81 (F-1) 4.40 ± 0.02 MHz	● RV6/MD-81 (D-2)

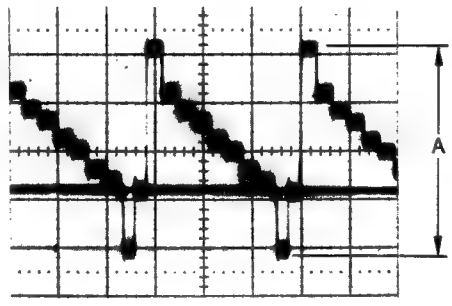
10-44. Y FM DEVIATION ADJUSTMENT (HI 8)

Before performing this adjustment, DM board adjustments should be completed.

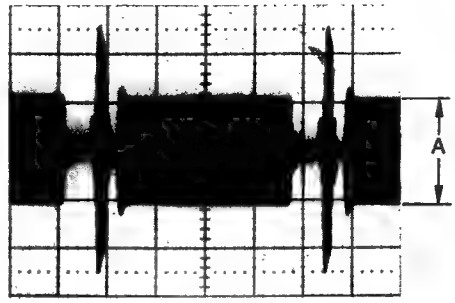
Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • Use a Hi 8 ME tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP32/DM-87 (F-2) (CH1)  Repeat recording/playback and adjustment until A level is 0.50 ± 0.02 V. Adjust RV8 while recording.	⊘ RV8/MD-81 (D-2) Turning clockwise reduces the level.

10-45. Y FM DEVIATION ADJUSTMENT (STD)

Before performing this adjustment, DM board adjustments should be completed.

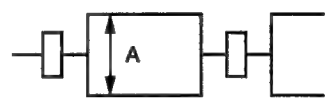
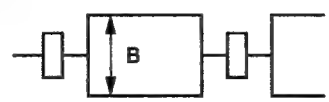
Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • Use a STD MP tape. • Record and playback the tape. • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP23/DM-87 (H-2)	TP32/DM-87 (F-2) (CH1)  Repeat recording/playback and adjustment until A level is 0.50 ± 0.02 V. Adjust RV7 while recording.	⊘ RV7/MD-81 (D-1) Turning clockwise reduces the level.

10-46. CHROMA EMPHASIS ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : MOD RAMP signal • Insert the Hi 8 ME tape to put into the Hi 8 mode. • E-E mode • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP5/MD-81 (F-3)	TP53/MD-81 (G-2) (CH1)  Minimize the A level.	⊘ FL5/MD-81 (G-2)

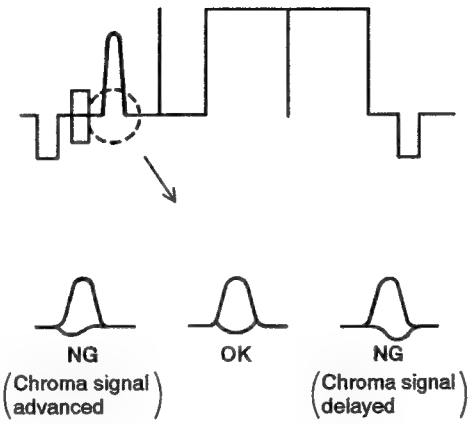
10-47. REC DUB CHROMA CURRENT ADJUSTMENT

(CONNECTION)

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • INPUT SELECT switch : DUB • DUB IN : color-bar signal • Short TP32/MD-81 (J-1) and TP33/MD-81 (J-2) to GND. • Short between TP36/MD-81 (K-1) and TP38/MD-81 (K-1). • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP5/MD-81 (F-3) After adjusted, disconnect the short wires.	• Measure A level of the VIDEO IN color-bar signal. TP30/MD-81 (M-1) (CH1)  • Change the mode from VIDEO IN to DUB IN. TP-30/MD-81 (M-1) (CH1)  B = A	⊘ RV703/MD-81 (J-3)

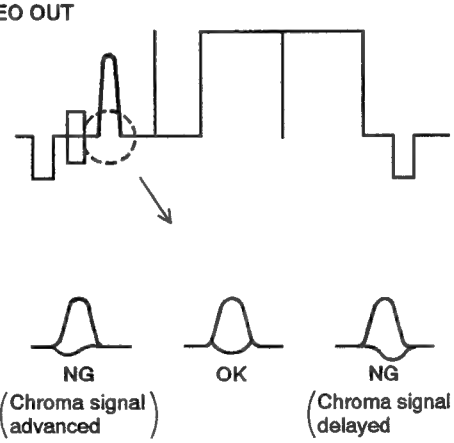
10-48. LINE/S REC Y/C DELAY ADJUSTMENT (Hi 8)

Before performing this adjustment, DM board adjustments should be completed.

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : Pulse & Bar signal • Use a Hi 8 ME tape. • Record and playback the tape.	Use the WFM. VIDEO OUT  	⊘ RV707/MD-81 (K-3)

10-49. LINE/S REC Y/C DELAY ADJUSTMENT (STD)

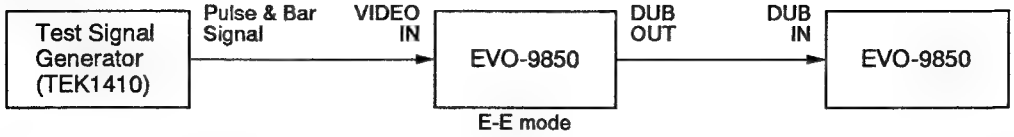
Before performing this adjustment, DM board adjustments should be completed.

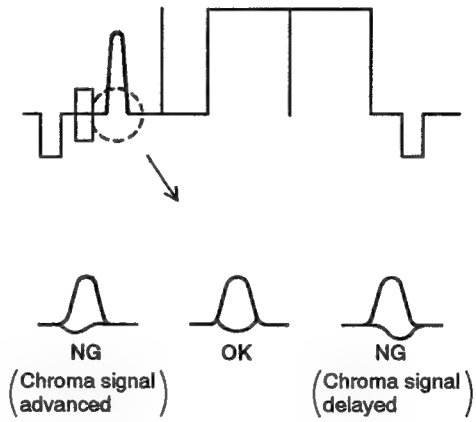
Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : Pulse & Bar signal • Use a STD MP tape. • Record and playback the tape.	Use the WFM. VIDEO OUT  	⊘ RV706/MD-81 (K-2)

10-50. DUB REC Y/C DELAY ADJUSTMENT (Hi 8)

Before performing this adjustment, DM board adjustments should be completed.

(CONNECTION)

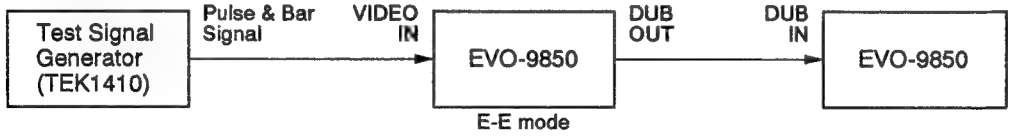


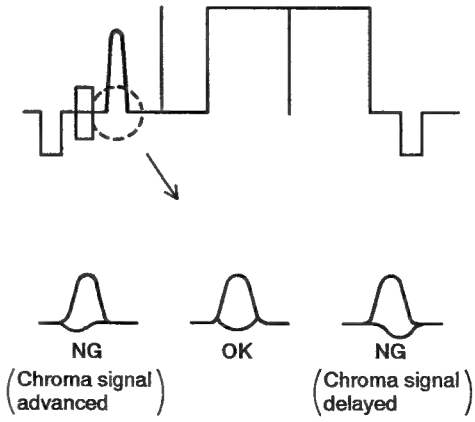
Machine condition for adjustment	Specifications	Adjustments
• DUB IN : Pulse & Bar signal • Use a Hi 8 ME tape. • Record and playback the tape.	Use the WFM. VIDEO OUT  	⊘ RV705/MD-81 (K-3)

10-51. DUB REC Y/C DELAY ADJUSTMENT (STD)

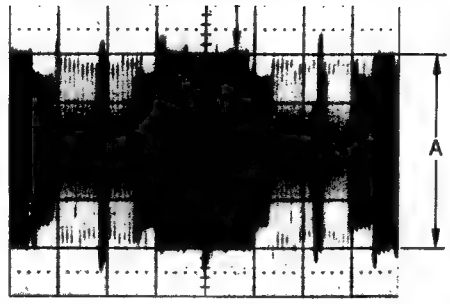
Before performing this adjustment, DM board adjustments should be completed.

(CONNECTION)

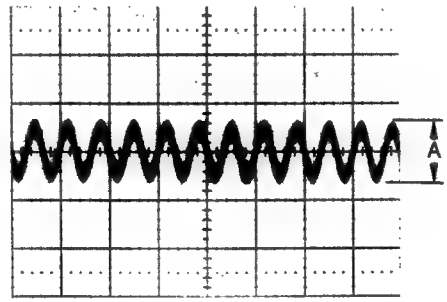


Machine condition for adjustment	Specifications	Adjustments
• DUB IN : Pulse & Bar signal • Use a STD MP tape. • Record and playback the tape.	Use the WFM. VIDEO OUT  	⊘ RV704/MD-81 (K-3)

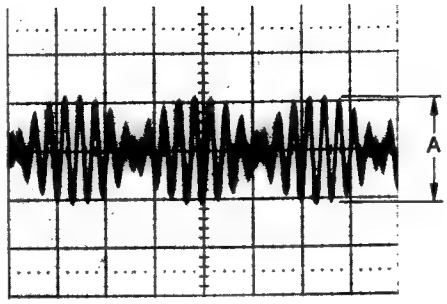
10-52. CHROMA MIXING LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • Short between TP36/MD-81 (K-1) and TP38/MD-81 (K-1). • Short TP32/MD-81 (J-1) and TP33/MD-81 (J-2) to GND. • OSCILLOSCOPE CH1 : 50 mV/div 20 μs/div TRIG: TP5/MD-81 (F-3) After adjusted, disconnect the short wires.	TP30/MD-81 (M-1) (CH1) RED  A = 185 ± 10 mVp-p (A : red level)	⊘ RV13/MD-81 (K-2)

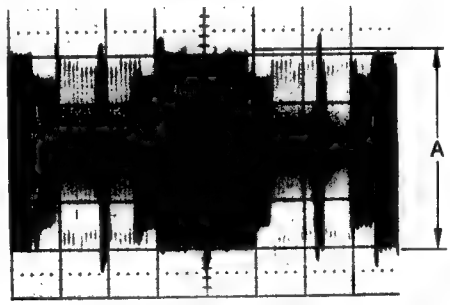
10-53. ATF MIXING LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • Short between TP36/MD-81 (K-1) and TP38/MD-81 (K-1). • Short TP33/MD-81 (J-2) and TP51/MD-81 (J-2) to GND. • OSCILLOSCOPE CH1 : 20 mV/div 0.2 μs/div TRIG: TP5/MD-81 (F-3) After adjusted, disconnect the short wires.	TP30/MD-81 (M-1) (CH1)  A = 50 ± 5 mVp-p	⊘ RV14/MD-81 (M-2)

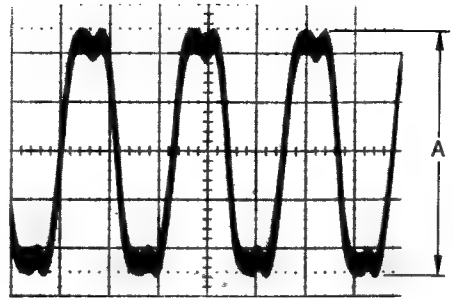
10-54. AFM MIXING LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • Short between TP36/MD-81 (K-1) and TP38/MD-81 (K-1). • Short TP32/MD-81 (J-1) and TP51/MD-81 (J-2) to GND. • OSCILLOSCOPE CH1 : 50 mV/div 2 μs/div TRIG: TP5/MD-81 (F-3) After adjusted, disconnect the short wires.	TP30/MD-81 (M-1) (CH1)  A = 120 ± 5 mVp-p	⊘ RV15/MD-81 (M-2)

10-55. REC CHROMA LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • Short TP28/MD-81 (H-1) to GND. • Short TP32/MD-81 (J-1) and TP33/MD-81 (J-2) to GND. • Short between TP36/MD-81 (K-1) and TP38/MD-81 (K-1). • OSCILLOSCOPE CH1 : 50 mV/div 20 μs/div TRIG: TP5/MD-81 (F-3) After adjusted, disconnect the short wires.	TP31/MD-81 (M-1) (CH1)  A = 108 ± 5 mVp-p	⊘ RV16/MD-81 (K-1)

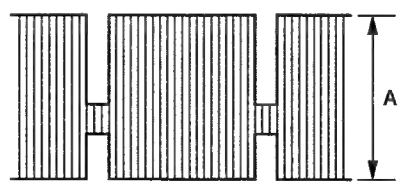
10-56. REC Y RF LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : No signal input • Insert the STD MP tape to put into the STD mode. • E-E mode • OSCILLOSCOPE CH1 : 0.1 V/div 0.1 μs/div TRIG: TP5/MD-81 (F-3)	TP31/MD-81 (M-1) (CH1)  A = 0.40 ± 0.02 Vp-p	⊘ RV17/MD-81 (K-1)

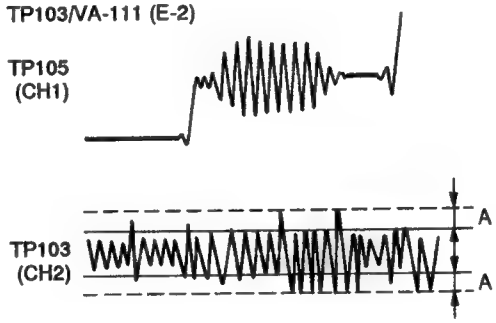
10-57. FLYING ERASE ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • Use a Hi 8 ME tape. • REC mode • OSCILLOSCOPE CH1 : 1 V/div 20 μs/div TRIG: TP5/VRA-4 (D-2)	TP11/VRA-4 (F-3) (CH1) A = 3.5 ± 0.1 V	⊘ RV1/VRA-4 (E-3)

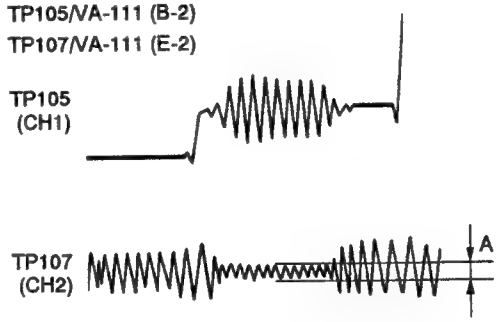
10-58. RECORDING CURRENT ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : 50% flat field signal • Use a Hi 8 ME tape. • REC mode • Short TP32/MD-81 (J-2), TP33/MD-81 (J-2) and TP51/MD-81 (J-2) to GND. • OSCILLOSCOPE CH1 : 0.1 V/div 5 ms/div TRIG: TP3/VRA-4 (D-2) After adjusted, disconnect the short wires.	TP5/VRA-4 (F-3) TP6/VRA-4 (F-3) (CH1)  A = 160 mVp-p	Ach : ⊘ RV2/VRA-4 (D-3) Bch : ⊘ RV3/VRA-4 (C-3)

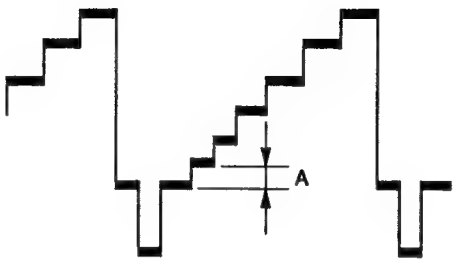
10-59. NOISE CANCELING ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode	CH1 : TP101/VA-111 (E-4) CH2 : TP102/VA-111 (E-3) (TP101 level) × 2 = TP102 level	⊘ RV101/VA-111 (F-4)
• OSCILLOSCOPE CH1 : 0.5 V/div 20 μs/div CH2 : 0.05 V/div 20 μs/div delay mode TRIG: CH1	TP105/VA-111 (B-2) TP103/VA-111 (E-2)  A (burst portion) : minimize	⊘ RV102/VA-111 (E-2)

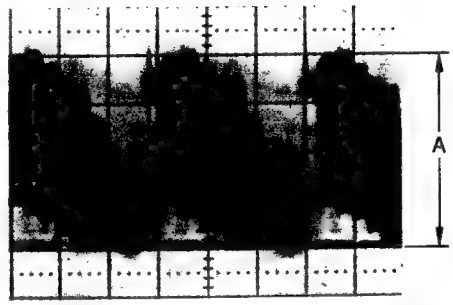
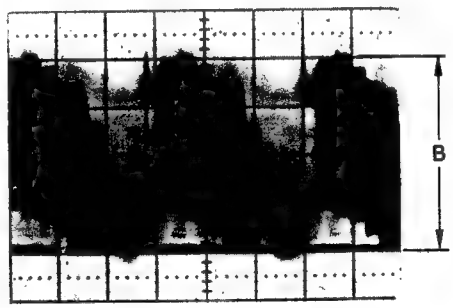
10-60. CHROMA NOISE CANCELING ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode	TP105/VA-111 (B-2) TP107/VA-111 (E-2)  A (burst portion) = 10 mVp-p or less	⊘ RV104/VA-111 (E-2)
• OSCILLOSCOPE CH1 : 0.5 V/div 20 μs/div CH2 : 0.1 V/div 20 μs/div delay mode TRIG: CH1		

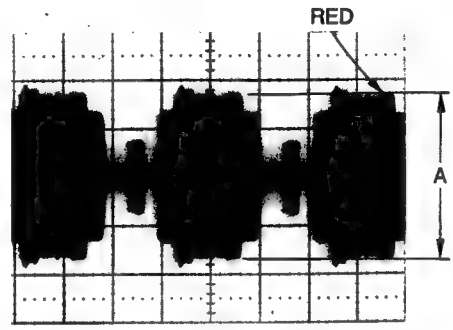
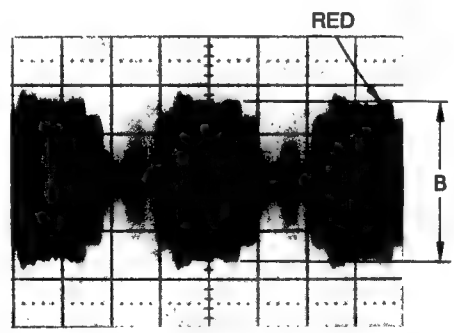
10-61. BLANKING LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : 5 STEP signal • TBC control : LOCAL • Use a Hi 8 ME tape. • TBC : ON • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP105/VA-111 (B-2)	TP802/VA-111 (G-2) (CH1)  A = 0 ± 10 mVdc	⊘ RV802/VA-111 (F-4)

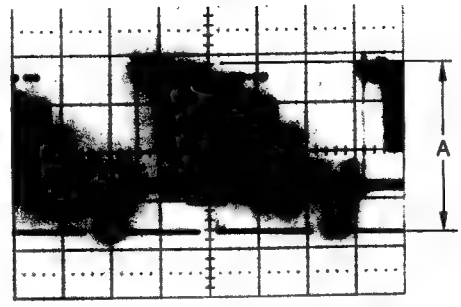
10-62. TBC MODE LINE OUTPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • VIDEO OUT : 75 Ω termination		
Step 1 • REC mode • OSCILLOSCOPE CH1 : 0.5 V/div 20 μs/div TRIG: CH1	TP105/VA-111 (B-2) (CH1)  A = 1.00 ± 0.05 V	⊘ RV103/VA-111 (D-2)
Step 2 • E-E mode • OSCILLOSCOPE CH1 : 0.5 V/div 20 μs/div TRIG: CH1 After adjusted, disconnect the 75 Ω termination.	TP105/VA-111 (B-2) (CH1)  B = A ± 0.01 V	⊘ RV807/VA-111 (G-2)

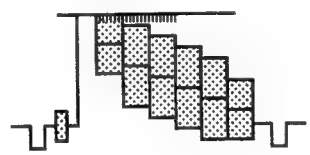
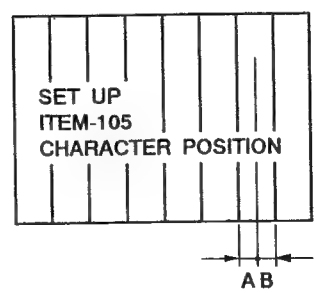
10-63. TBC MODE CHROMA OUTPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal (Chroma level is 75% with SETUP) • VIDEO OUT : 75 Ω termination		
Step 1 • REC mode • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP105/VA-111 (B-2)	TP106/VA-111 (E-2) (CH1)  A = 0.628 ± 0.010 V	⊘ RV105/VA-111 (D-1)
Step 2 • NOISE REDUCTION SW (sub-panel) : 2 • E-E mode • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP105/VA-111 (B-2) After adjusted, disconnect the 75 Ω termination.	TP106/VA-111 (E-2) (CH1)  B = A ± 0.050 V	⊘ RV808/VA-111 (H-2)

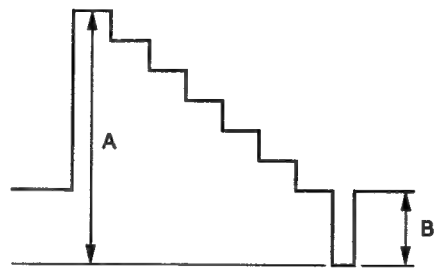
10-64. MONITOR OUTPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• MONITOR OUT CONNECTOR : 75 Ω termination • Playback the color-bar signal portion of the alignment tape WR5-8NSE. • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP105/VA-111 (B-2) After adjusted, disconnect the 75 Ω termination.	TP122/VA-111 (A-4) (CH1)  A = 1.00 ± 0.05 V	● RV111/VA-111 (A-4)

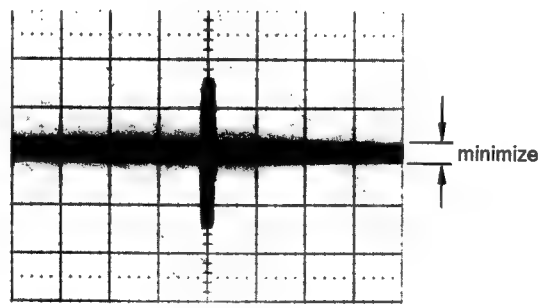
10-65. CHARACTER MIXING ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • Set the COUNTER/TC/DIAL MENU SW to DIAL MENU. • Connect the monitor to MONITOR OUT.	TP122/VA-111 (A-4) Turn the JOG dial while pressing the MENU key, and set the counter value to "105." Adjust so that the white level of TP122 and that of the characters match each other. (CH1) 	● RV110/VA-111 (A-2)
• OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP105/VA-111 (B-2) Return the CTL/TC/DIAL MENU SW to COUNTER after the adjustment.	Display  Position the right end of character "N" at the blue center (A = B).	● CV100/SST-2 (N-3)

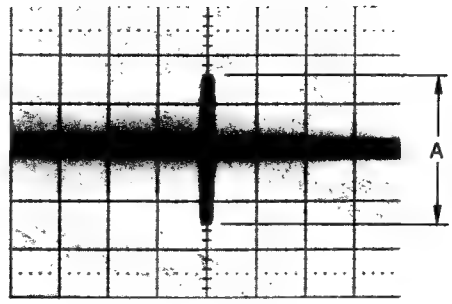
10-66. COMPONENT SYNC MIXING LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode	Use the WFM. VIDEO OUT  A = 100%, adjust B = 29 ± 1%.	⊘ RV803/VA-111 (H-3)

10-67. MODULATOR BALANCE ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP105/VA-111 (B-2)	TP805/VA-111 (J-3) (CH1)  	⊘ RV805/VA-111 (K-4)

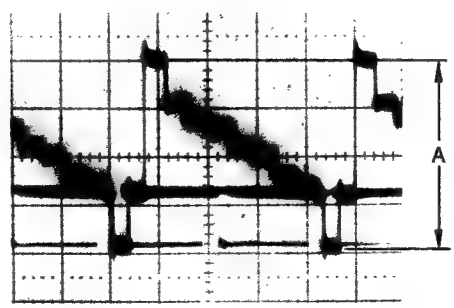
10-68. BURST LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• VIDEO IN : color-bar signal • E-E mode • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP105/VA-111 (B-2)	TP805/VA-111 (J-3) (CH1)  A = 286 mVp-p	⊘ RV806/VA-111 (J-4)

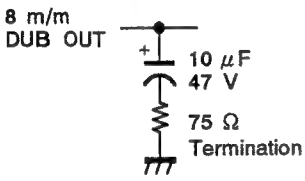
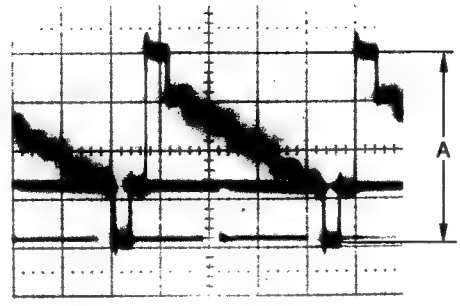
10-69. LOCAL OSCILLATION FREQUENCY ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• STOP mode	Use the frequency counter. TP111/VA-111 (M-2) 4267907 ± 400 Hz	⊘ CV101/VA-111 (K-1)

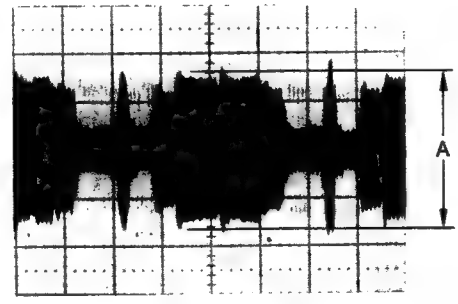
10-70. U-matic DUB Y OUTPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• U-matic DUB OUT : No termination • DUB OUT SW (sub-panel) : U-SP • Playback the color-bar signal portion of the alignment tape WR5-8NSE. • OSCILLOSCOPE CH1 : 0.5 V/div 20 μs/div TRIG: TP105/VA-111 (B-2)	TP120/VA-111 (B-5) (CH1)  A = 1.7 ± 0.1 V	⊘ RV108/VA-111 (C-5)

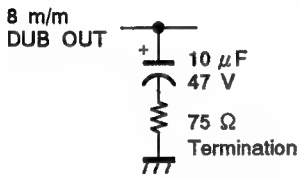
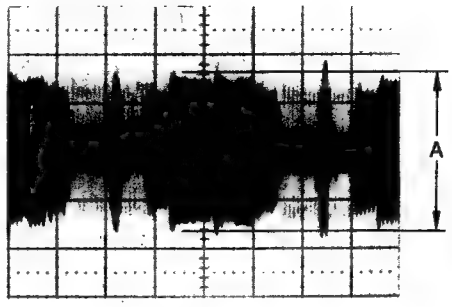
10-71. 8 m/m DUB Y OUTPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• 8 m/m DUB OUT : 75 Ω termination • DUB OUT SW (sub-panel) : 8 m/m • Playback the color-bar signal portion of the alignment tape WR5-8NSE.  • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP105/VA-111 (B-2) After adjusted, disconnect the 75 Ω termination.	TP120/VA-111 (B-5) (CH1)  A = 0.5 ± 0.1 V	⊘ RV109/VA-111 (C-4)

10-72. U-matic DUB CHROMA OUTPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• U-matic DUB OUT : No termination • DUB OUT SW (sub-panel) : U-SP • Playback the color-bar signal portion of the alignment tape WR5-8NSE. • OSCILLOSCOPE CH1 : 0.2 V/div 20 μs/div TRIG: TP105/VA-111 (B-2)	TP115/VA-111 (L-5) (CH1)  A = 0.90 ± 0.05 Vp-p	⊘ RV107/VA-111 (L-4)

10-73. 8 m/m DUB CHROMA OUTPUT LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• 8 m/m DUB OUT : 75 Ω termination • DUB OUT SW (sub-panel) : 8 m/m • Playback the color-bar signal portion of the alignment tape WR5-8NSE.  • OSCILLOSCOPE CH1 : 0.1 V/div 20 μs/div TRIG: TP105/VA-111 (B-2) After adjusted, disconnect the 75 Ω termination.	TP115/VA-111 (L-5) (CH1)  A = 0.50 ± 0.02 Vp-p	⊘ RV106/VA-111 (M-6)

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RV25	10-11
RV26	10-11
RV27	10-13

FL-129 BOARD

Ref. No.	Page
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RV3	10-12
RV4	10-12
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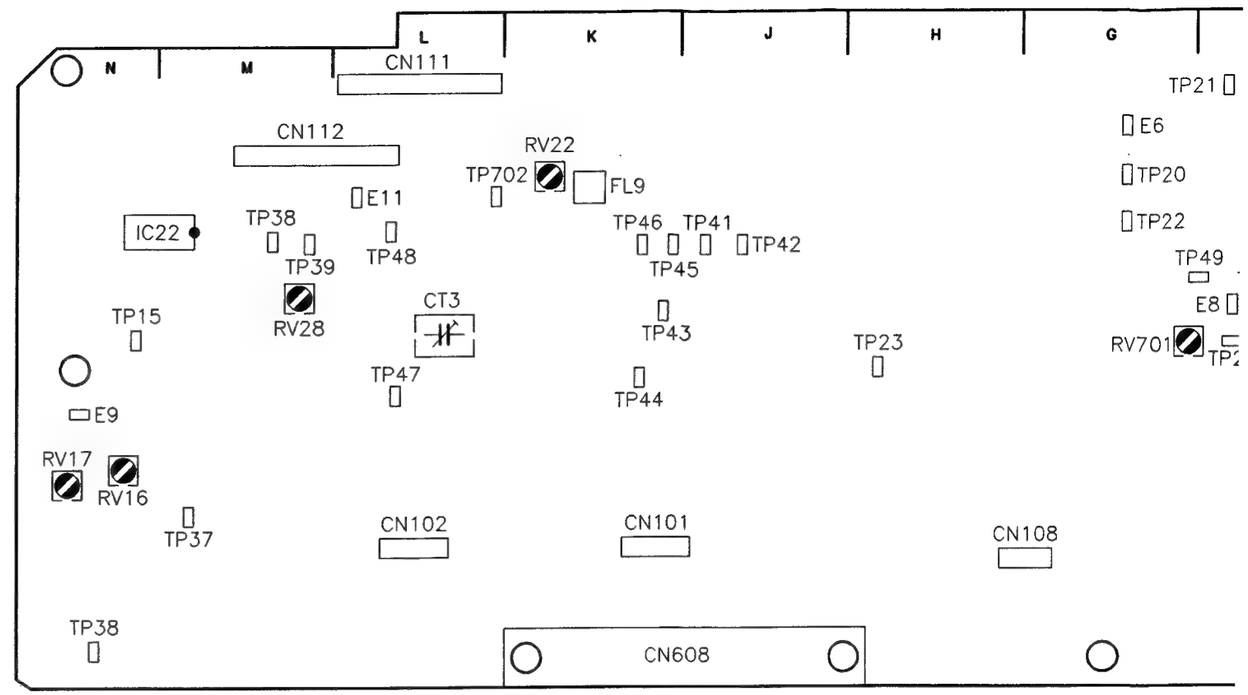
FL-130 BOARD

Ref. No.	Page
CT1	10-5

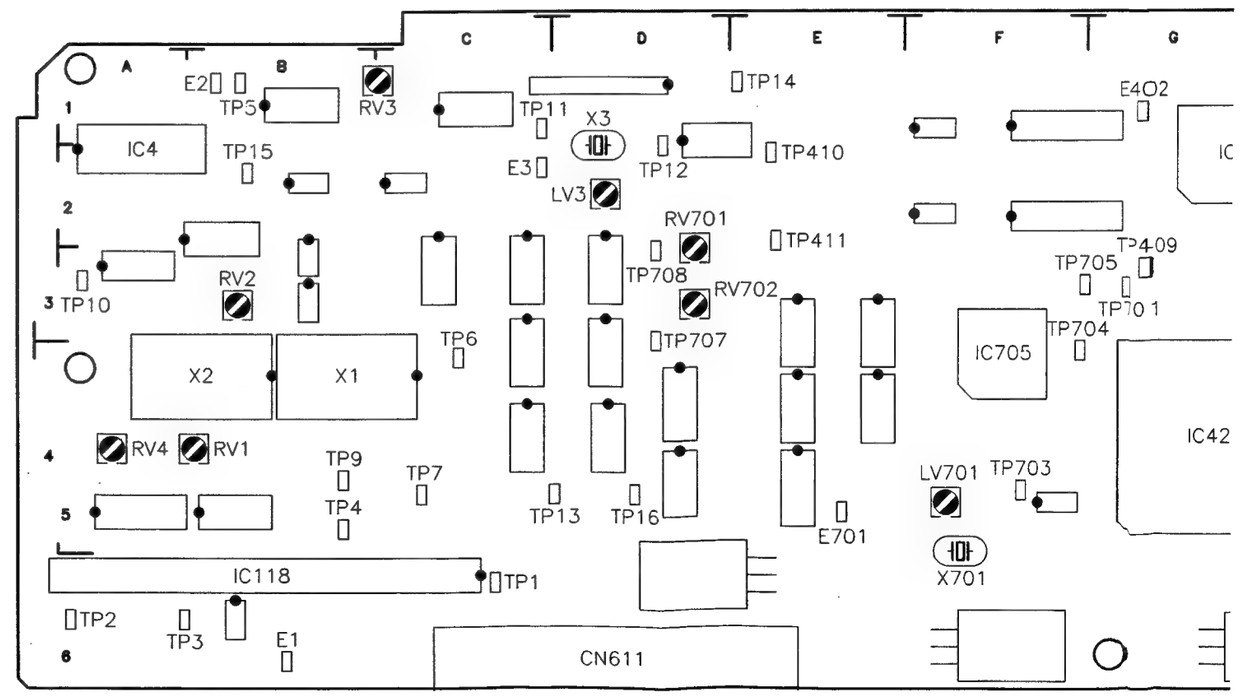
FL-131 BOARD

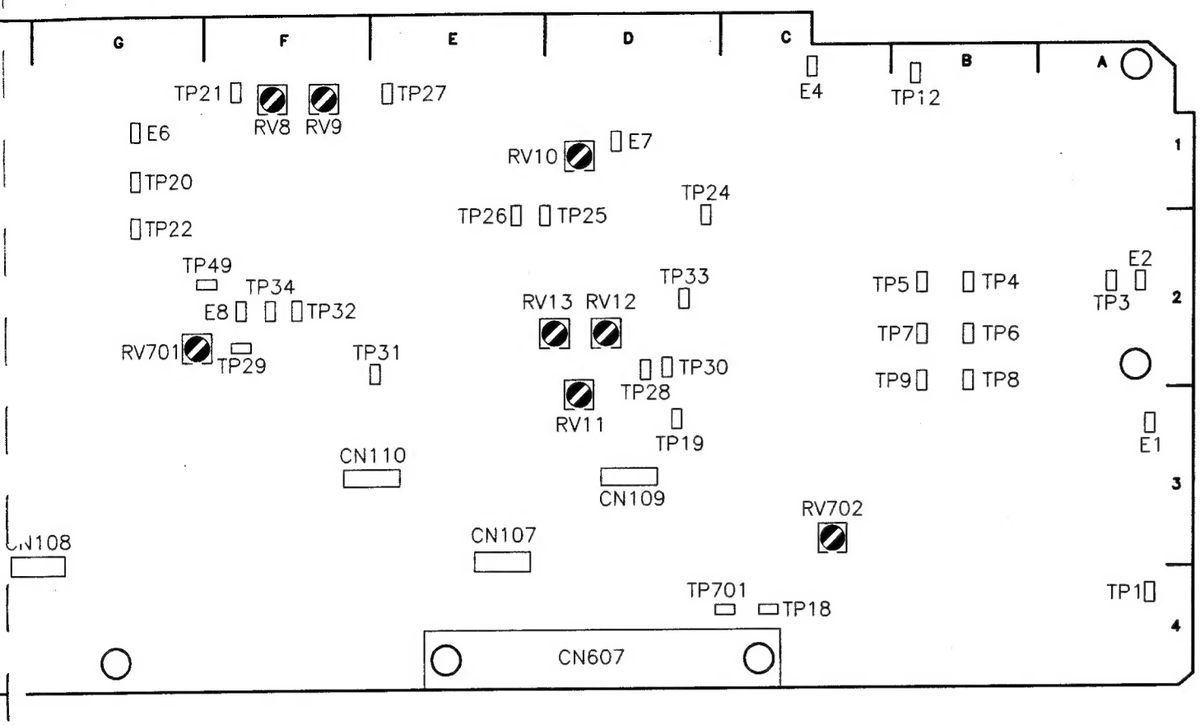
Ref. No.	Page
CT2	10-6
RV15	10-7

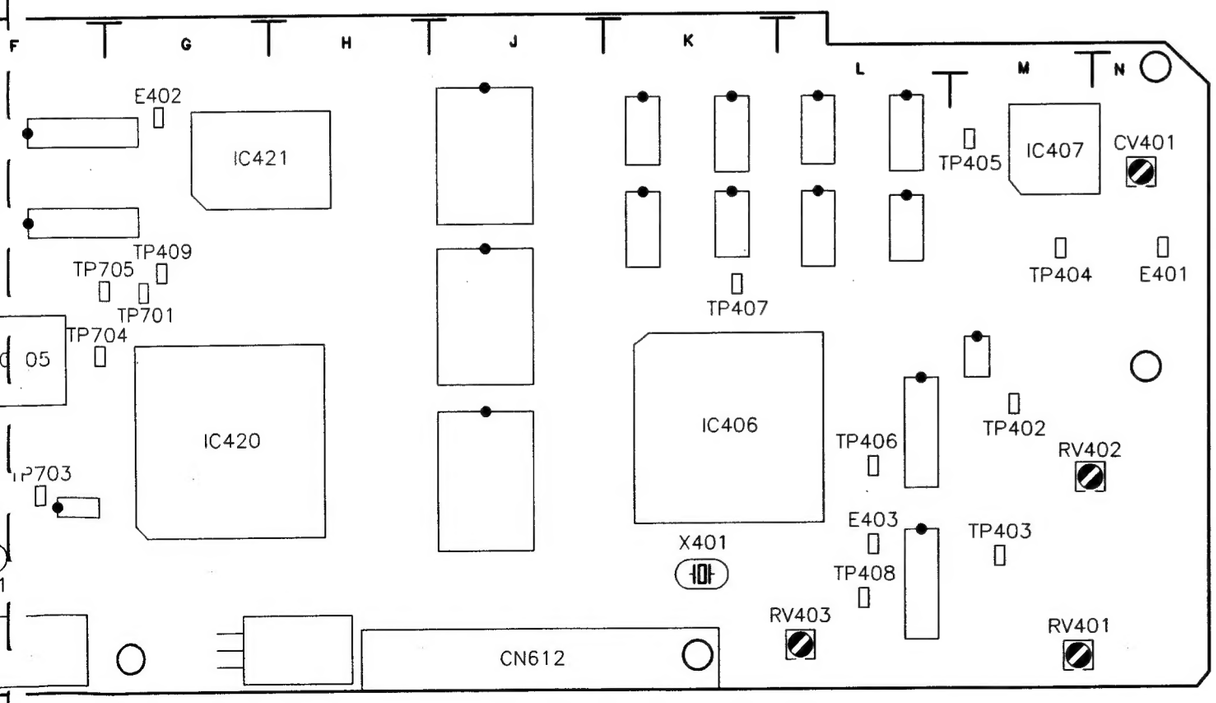
Locations of RVs on DM-87 Board.



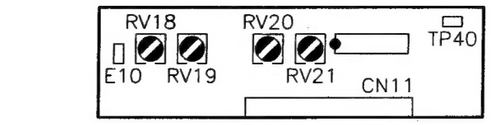
Locations of RVs, CVs and LVs on TBC-21 Board.

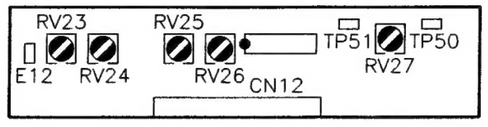




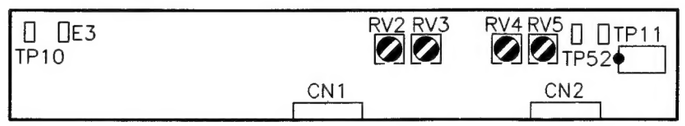


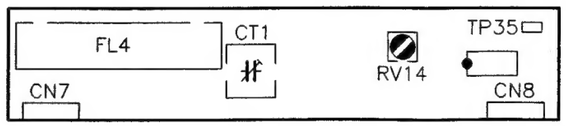
Locations of RVs on CR-40 and CR-41 Boards.

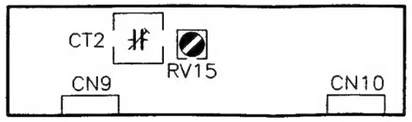




Locations of RVs on FL-129, FL-130 and FL-131 Boards.







MD-81 BOARD

Ref. No.	Page
FL5	10-23
RV1	10-19
RV2	10-20
RV3	10-20
RV4	10-19
RV5	10-21
RV6	10-21
RV7	10-22
RV8	10-22
RV10	10-21
RV13	10-26
RV14	10-26
RV15	10-27
RV16	10-27
RV17	10-28
RV700	10-21
RV703	10-23
RV704	10-25
RV705	10-25
RV706	10-24
RV707	10-24

VA-111 BOARD

Ref. No.	Page
CV101	10-35
RV101	10-29
RV102	10-29
RV103	10-31
RV104	10-29
RV105	10-32
RV106	10-37
RV107	10-36
RV108	10-35
RV109	10-36
RV110	10-33
RV111	10-33
RV802	10-30
RV803	10-34
RV805	10-34
RV806	10-35
RV807	10-31
RV808	10-32

PRE-10 BOARD

Ref. No.	Page
RV1	10-2
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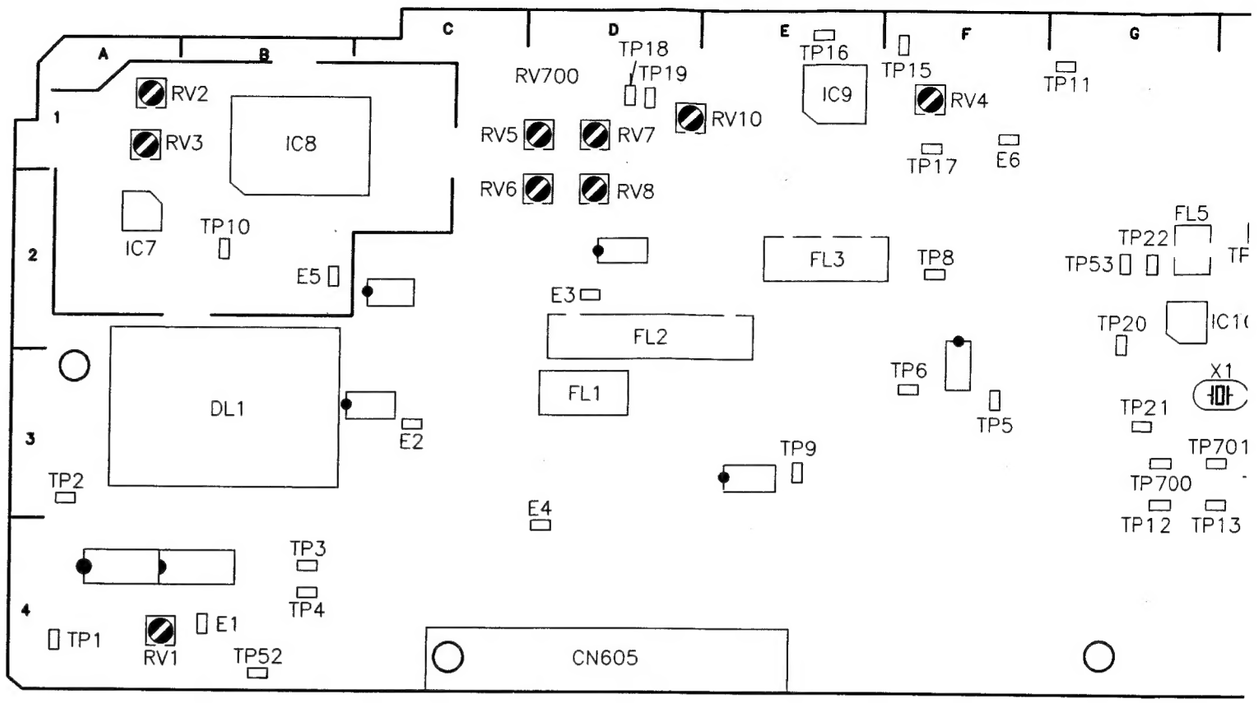
RV3	10-2
RV4	10-2
RV5	10-2
RV6	10-2
RV7	10-3
RV8	10-3

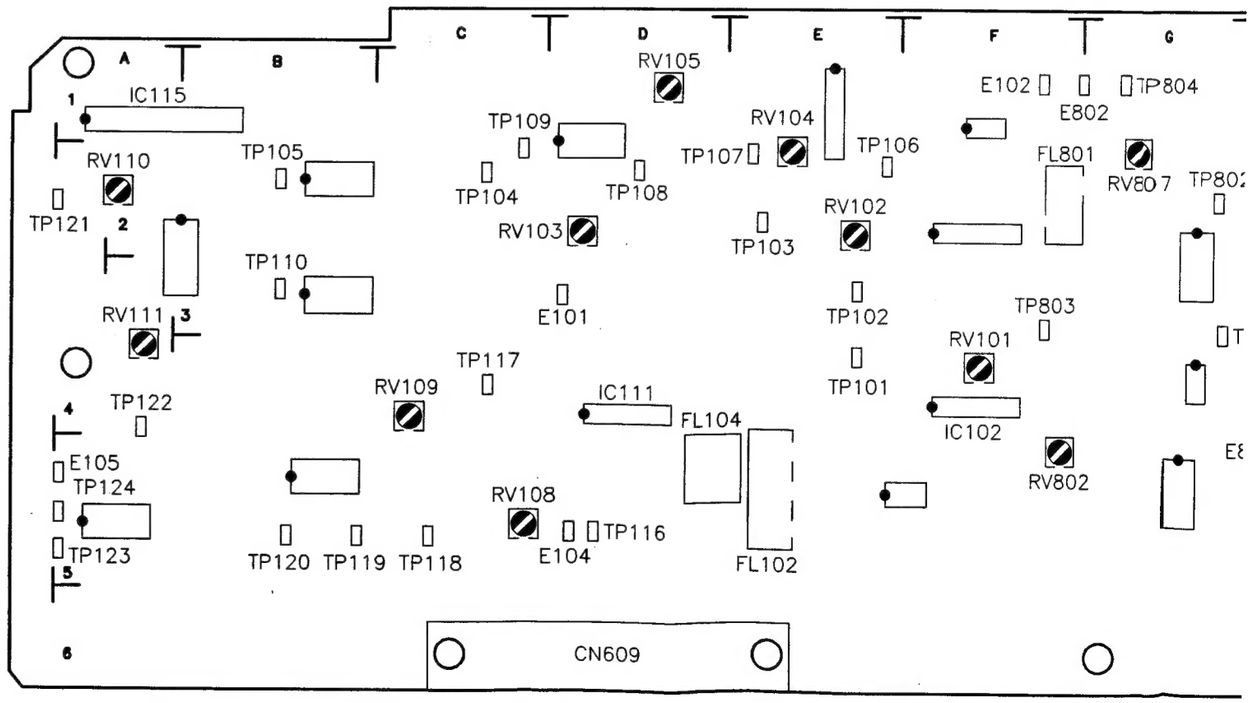
VRA-4 BOARD

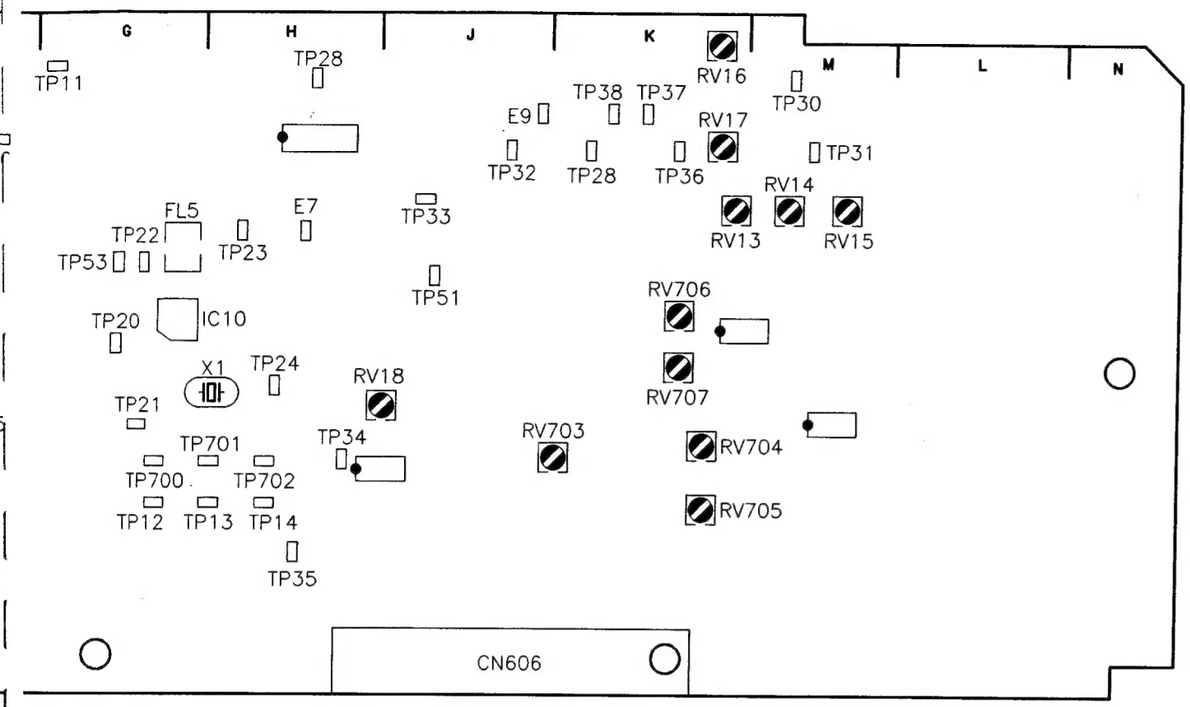
Ref. No.	Page
RV1	10-28
RV2	10-28
RV3	10-28

Locations of RVs on MD-81 Board.

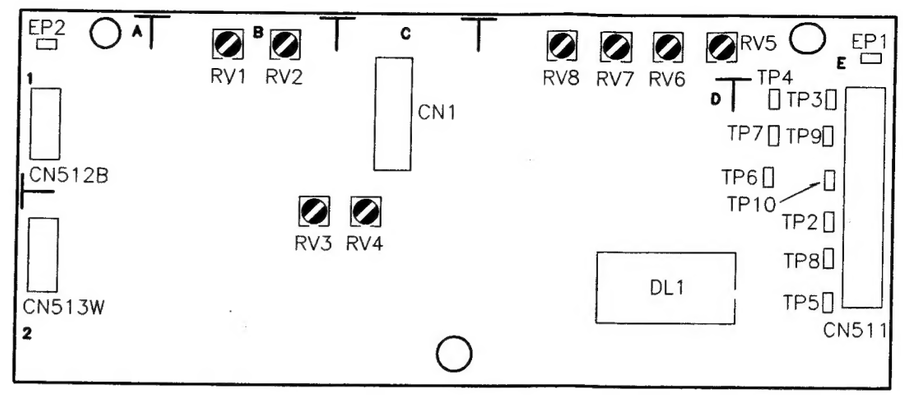


Locations of RVs, CVs and LVs on VA-111 Board.

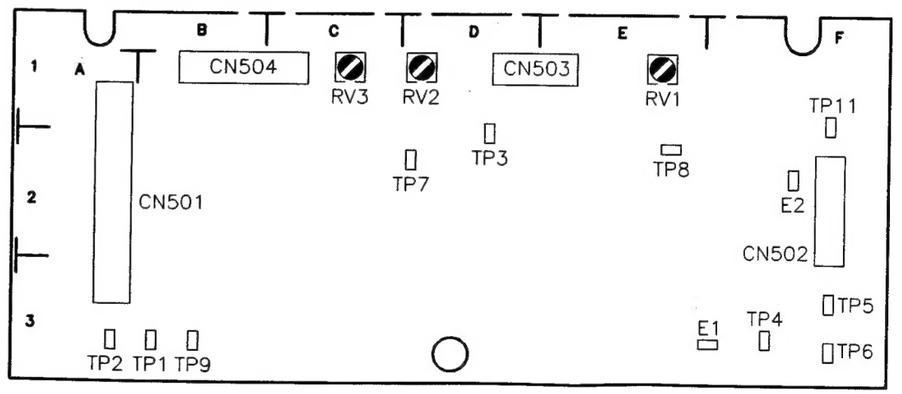


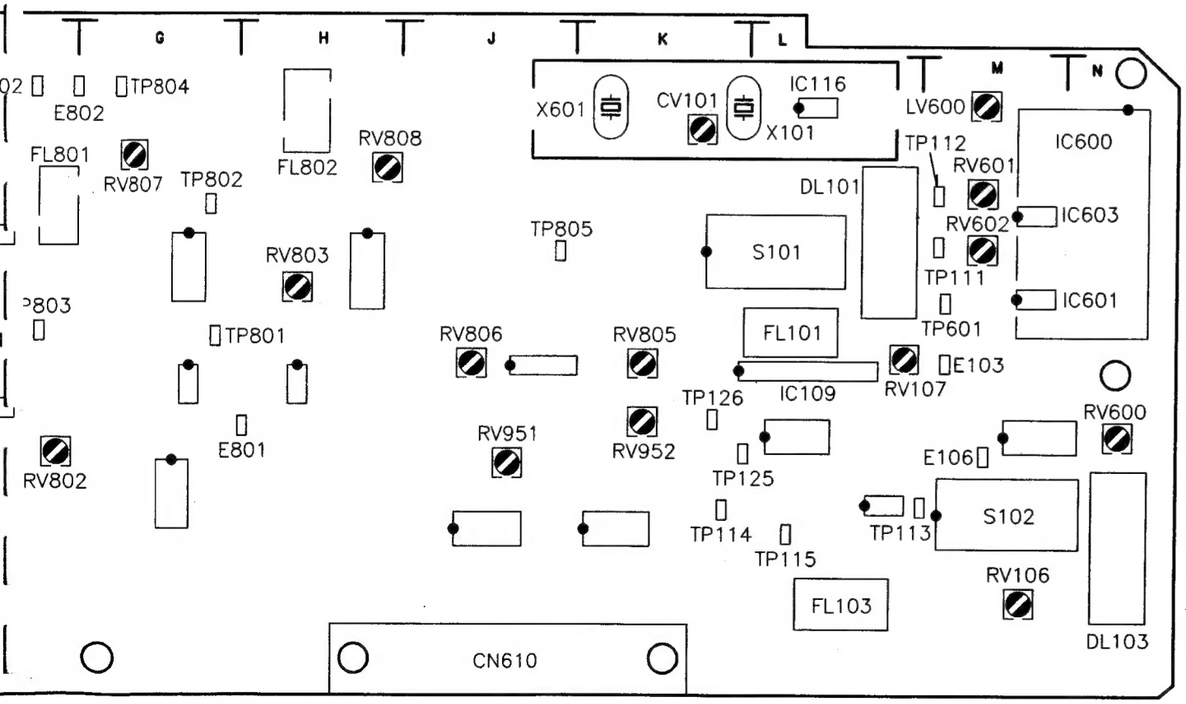


Locations of RVs on PRE-10 Board.



Locations of RVs on VRA-4 Board.





SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

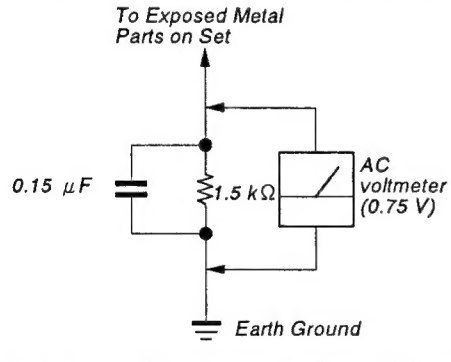


Fig. A. Using an AC voltmeter to check AC leakage.